AMERICAN GAS ASSOCIATION MONTHLY

Vol. IV No. 3

MARCH, 1922

WE have a united industry, with the facilities and the machinery of the American Gas Association, consisting of its executive staff, its records, its reports, its committees and its personnel. Let us face our plain duty and demand what is obviously necessary, fair and just, not only to the industry, but to the public which we serve.

—DANA D. BARNUM

To the New England Gas Engineers

From June 1, 1921
to
March 15, 1922

Labor troubles at our printer's establishment have held up the publication of the

---

GAS CHEMISTS' HANDBOOK
(Revised Edition)

Through all these months we have had to apologize for a delay that was beyond our control.

But this delay has shown us the—

URGENT NEED

That our members have felt for this publication and we know they will welcome the announcement that the REVISED EDITION will be available

March 15, 1922

Pending orders will be filled promptly on that date.

$6.00 U. S. & Canada $6.50 Foreign Countries

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FOR STATEMENTS AND OPINIONS CONTAINED IN PAPERS AND DISCUSSIONS APPEARING HEREIN, THE ASSOCIATION DOES NOT HOLD ITSELF RESPONSIBLE

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American Gas Association Monthly

Vol. IV MARCH, 1922 No. 3

From Mr. Barnum's Address to the New England Gas Engineers

"At the present time there are probably few who will dispute the statement that increased volume of business is our greatest need. We must not allow our sales to fall behind; we must not stand still while others advance, for that is relatively also falling behind, therefore, we must advance. To advance we must have increased sales, not only those which come from customers' demands under present conditions of service, but we must make conditions such that customers' demands will be greatly augmented.

"******The old saying that the money of the gas company is made or lost in a retort house should not be forgotten. There is a fertile field for research work and development in the generating of gas. The industry has been handicapped because of the fact that where companies are operated, as most are, on the principle of service at cost, there has been little or no incentive, in fact there has been scant opportunity, for the companies to spend money in experimenting with new installations. Consequently, companies have been forced to build plants of such a nature that former standard results were assured, but in few cases have companies been in a position where they could build with the idea of obtaining any reward in return for the risk involved in new designs.

The Technical Section of the American Gas Association is at work on this problem. The industry has the experience and the men, and the company members have the facilities, and through this agency we hope to bring about constructive work in this department."

"The time will soon come, if it has not already arrived, when the industry as a whole, instead of going before regulatory bodies and asking for a given rate or a certain standard, must go before the proper authorities and demand that if we are going to develop this industry,—if we are going to fulfill our full duty to the public and develop the possibilities which we know are inherent in the business, we must have more freedom as to rates and standards."

AMERICAN GAS ASSOCIATION MONTHLY

Vol. IV MARCH, 1922 No. 3

Exhibiting at Industrial Exhibitions

DOES it pay the local gas company and gas appliance manufacturers to exhibit at trade and industrial expositions open to the public? To some, this is a debatable question. To others, exhibits have no sales value at all. And to still others, expositions are always supported because they have resulted in direct sales and a number of successful leads.

There are hundreds of so-called expositions held yearly where gas has an intimate bearing on the industries that take part in the exhibit, and, if the right class of appliances is displayed, there is no doubt but what direct sales will result. There may be some who will disagree with this statement because of past experience, but it is generally true, nevertheless.

One of the first lessons to learn in order to exhibit successfully, is to know beforehand just what kind of an exposition is to be held and what the general purpose of the undertaking is going to be. For example, it is of questionable value to exhibit domestic gas appliances at a show where the other exhibits are strictly of an industrial nature. On the other hand, if the show

is devoted to home furnishings and equipment, several booths containing domestic gas appliances would be well patronized.

The recent exhibit of the Brooklyn Union Gas Company at the Brooklyn Manufacturers Industrial Exposition bears out the above statements. Furthermore, the records of sales and interest shown in previous years indicate that at an exhibit of this kind, the industrial appliances attract unusual attention whereas the purely domestic appliances are generally overlooked because they do not appeal to the specialized requirements of the public attending.

Space heaters and lighting fixtures applicable for office use are the only exceptions, as several sales of these result from exhibitions made at shows where the appeal is along different lines. At the Brooklyn show it was also demonstrated that water heaters and heating boilers applicable for every class of building, are well worth exhibiting.

It will be a matter of pleasure and gratification to members of the American Gas Association to learn that President Dana D. Barnum was recently elected President of the Boston Consolidated Gas Company.

What Is Your Opinion?

THERE are many questions relative to burner design, the proper installation of various gas appliances, the proper materials for various purposes, efficiency of operation, flues, etc., which we continually hear discussed among gas men and manufacturers. The difficulty thus far has been that these discussions never lead to anything definite or concrete, due to the inability of assembling information at one point where it can be thoroughly digested and given to the industry as a whole.

In view of this, it will, therefore, be the endeavor of this Association through its service engineer, Mr. N. T. Sellman, to collect this information from all interested sources. When this information has been collected it will be turned over to the Committee on Standardization of Gas Appliance Specifications to be used as a basis for formulating new Specifications covering these various subjects.

Also, the answers together with such logical conclusions as can be drawn from them will appear each month in the Bulletin as soon thereafter as possible.

Progress in the design of gas appliances and in the service derived from them can be realized in two ways. First, by improvements over the existing applances and methods; second, by the industry adopting the present best known method, and thus eliminating many of the present troubles. It is to take advantage of this second, easily available source for progress that we are attempting this activity.

The best appliance improperly installed will not give better satisfaction than a poor appliance which is properly installed; furthermore, many so-called good appliances can be made absolutely satisfactory if we only face the truth. Remember, your most profitable "Salesman" is a pleased and enthusiastic customer, one who is so impressed with the services rendered that he tells his friends about his good "judgment" or "luck."

Now! Let us hear from all interested gas men and manufacturers. What is your experience? What do the men working for you think?

Send your answers to:

N. T. Sellman, Service Engineer
American Gas Association,
130 East 15th Street,
New York City.

See following page

Question No. 1—GAUZE BURNERS

It is commonly known that the use of gauze in burners prevents flashback, but has certain disadvantages which are, namely—

1—Collection of dust in the mesh with an ultimate reduction in opening sufficient to eventually affect combustion.

2—Reduction of the gas stream velocity because of back pressure and burner mixture pressure outside the gauze. This works two ways; it reduces the amount of primary air entrained and "deadens" the character of the flame itself. This is relative to what is the case if no gauze is used in the same burner.

3—The use of gauze necessitates "split" or "assembled" burner construction which involves joints that must be easily made gas tight as the burners often have to be cleaned or repaired on the customers premises.

One large gas company has taken the stand that one-piece cast iron burners of proper design can be made for all purposes and which will not flash back, and that in making these burners all the objections of the gauze are eliminated. It is still considered to be a one-piece burner if only the ports are "built up."

There has been sufficient progress in burner design and applications to appliances to make this seem reasonable. The following definite questions will help us get answers which can be more easily assembled into a consensus of opinion.

(a) Do you think that burners which will not flash back can be built for all purposes without the use of gauze?

(b) If not, can they be used without automatic control?

(c) If not, can they be used with automatic snap control?

(d) Can burners without gauzes be used in the following specific cases?

1—Radiant Fires

2—Water Heaters { Without automatic control? / With snap valve control? / With gradual control?

3—Boilers { Pressure? / House Heating?

(e) Do you think there would be an advantage gained in eliminating gauzes?

(f) On what kind of gas do you base your opinion; natural B. t. u., coal B. t. u., water B. t. u., or mixed B. t. u.?

Water Gas Tar Emulsions*

By WM. W. ODELL, Gas Engineer, Bureau of Mines.

THERE is outlined below the essential facts brought out in an investigation into the causes for emulsion difficulties as experienced at many water gas plants. The investigation was conducted under a co-operative agreement between the University of Illinois Engineering Experiment Station, the Illinois State Geological Survey, and the U. S. Bureau of Mines. Funds of the Illinois Gas Association were used to defray a part of the costs.

Active assistance was rendered by the Peoples Gas Light and Coke Company of Chicago, who furnished a laboratory at Chicago for conducting the experiments, and loaned the services of E. A. Thiele to help with the laboratory work.

A full report on the results of this work will be issued later, but it is believed desirable to bring the principal results now to the attention of the industry.

Scope and Purpose of Work

In almost every gas plant where carbureted water gas is made, some difficulty is experienced, at one time or another, in separating the tar from the water condensing from the gas. The fact that the annoyance from this source is ever present in some plants, and seldom present in others, leads to the belief that certain operating variables had considerable to do with the formation of difficultly separable tar water emulsions. Accordingly, when samples of tar were collected for laboratory study, the operating conditions and methods were simultaneously observed and recorded.

Water Gas Tar—What it Really is

In the carburetion of water gas the aim is always to convert as much of the oil used as possible into fixed gases; the conversion, however, is never 100 per cent complete, but invariably appreciable amounts of condensable tarry matter or carbon, or both, form in the checker chambers. This condensable matter, which is water gas tar, may be composed of substances resulting chiefly from the cracking of oil, or it may consist, in part of some of the ingredients of the original oil which resisted cracking. As produced in the various plants water gas tars are not uniform in character, but may very materially differ in their physical and chemical properties. The tar may be brown in color, thin or watery in consistency, contain a large percentage of light oils, and have a specific gravity but slightly greater than 1.00, or it may be a black liquid of the consistency of molasses, containing a much smaller percentage of light oil and a specific gravity as high as 1.15. Furthermore, the percentages of free carbon and naphthalene are different in the various tars, varying from almost zero to a relatively high percentage.

Water Gas Tar Emulsions and Their Formation

Water gas tar emulsion is tar produced as described, in which small droplets of water are suspended, which latter do not readily separate from the tar. The quantity of water that may be so retained is as high as 85 per cent of the whole. The consistency of the emulsion depends,

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other things being equal, on the percentage of water present, (the viscosity increasing with the water content) becoming somewhat buttery when the water content is as high as 75 to 80 per cent. The size of the droplets of dispersed water is not the same in all tar emulsions, or in any particular tar emulsion. The water of the emulsion is a result of condensation of the excess of generator steam which it is necessary to use in the manufacture of the gas and of the water vaporized during the passage of the hot gas thru the wash box. The quantity of water so condensing is usually more than four times greater than the quantity of tar. Although the method of cooling the gas and condensing the tar and water has considerable bearing on the formation of emulsions, it is not surprising that emulsions form; it is their permanency which calls for attention.

Analysis of tar samples collected at different drips of a given gas works shows that the tendency for stable emulsions to form is not the same in the different units of the cooling system. This fact leads to certain conclusions, and is itself a clue to the causes for the formation of stable emulsions.

Two distinct types of oil water emulsions are common; in one type the oil is dispersed in the water, and in the other the water is dispersed in the oil. Water gas tar emulsions are typical of the latter. Certain substances, when properly mixed with oil and water, cause the formation of one type of emulsion, while certain other substances favor the formation of the other type of emulsion. The physical character of emulsions varies with changes in the relative percentage of the water and oil present.

Quality of Water Gas Tar

The analyses of the tar samples collected in various parts of the cooling system show that they are progressively different in some important aspects accordingly as they are progressively condensed in the different stages of cooling. The tar condensing at the highest temperature (nearest the water gas set) has the highest specific gravity and the largest percentages of free carbon, residue upon distilling to 355° C., and paraffin hydrocarbons, and the lowest percentage of naphthalene solids. Furthermore, it is usually the tar which condenses from the gas in the early stage of cooling that forms the most obstinate (stable) emulsions.

There are a number of factors that have a pronounced influence on the quality of water gas tar, some of which are the following:

1. Temperature in the checker chambers.
2. Checker brick spacing.
3. Rate of input of carbureting oil.
4. Distribution of oil. (Efficiency of the oil spray nozzle.)
5. Kind of oil used.
6. Average condition of checker brick. (Frequency of recheckering.)
7. Quantity of excess steam used.
8. Character of the condensing system, and rate of cooling the gas.

These factors are discussed in the original paper.

Factors Affecting the Settling of and Formation of Tar Emulsions

Upon considering the nature of water gas tar emulsions the question may arise, "Why is water always the inner phase, even when present to the extent of 60 to 70 per cent of the whole?" Also, "Do all such emulsions settle or separate at the same rate, and if not, why not?" If these different effects are dependent

wholly, or chiefly, on the varying composition of the tars, then the method for controlling the emulsion difficulties lies in controlling the factors affecting the quality of the tar insofar as this procedure is economical; if they are dependent on substances dissolved in the water of the emulsion, or on the size of the particles (droplets) of water, then the method of cooling the gas is of most importance. As a matter of fact, the tendency to form stable emulsions is affected both by the condensing and cooling methods and the quality of the tar itself. Water is invariably the inner phase in such emulsions because of emulsifying agents present in the tar. The rate of separation is not the same in the different emulsions, but is dependent on the temperature of the emulsion, specific gravity and composition of the tar, soluble constituents in the water, size of the dispersed water droplets, and other variables.

In general, it may be said of emulsifying agents that those substances which are more easily wetted by water than by oil, tend to cause the formation of emulsions in which water is the outer phase, while substances more readily wetted by oil favor the formation of emulsions wherein oil is the outer phase. Since tar is an emulsion of the latter type, it may be supposed that it contains such an emulsifying agent; it does, and the substance is the free carbon present in varying amounts in almost all tars. The fact that free carbon is present in greater percentages in coal tars (which do not readily form emulsions with water) than in water gas tars does not, *apparently*, harmonize with this observation. Other factors must also be considered to fully appreciate the significant part the free carbon actually plays. Experiments in preparing artificial tars (emulsions), using various oils with water, and employing carbon black in various proportions as the emulsifier, show that with a given oil water mixture the addition of a very small percentage of carbon causes, upon agitation, the formation of a weak emulsion; further increments in the quantity of carbon used, up to a certain point, increase the stability of the emulsion, beyond this point increments of carbon have the opposite effect. If carbon black is mixed with tar emulsion in proper portions the water is almost entirely liberated, and may be poured off as such. Seven per cent of carbon is sufficient to completely free the water in the oil water emulsions made. The concentration of the free carbon in tar is, therefore, of importance in the study of tar emulsion difficulties.

In emulsifying various mineral and tar oils it was found that the paraffin oils lend themselves most readily to the formation of stable emulsions by the use of carbon. This is in accordance with the fact that, other things being the same, water gas tars which on condensing form stable emulsions contain a higher percentage of paraffin oils than do those tars which are not so emulsified. This proved to be the case with the tars tested.

The factors affecting the completeness of oil cracking also influences the quality of tar produced and the tendency for emulsions to form. The proper control of these factors is one method for controlling the rate of separation of tar from the emulsions formed in the gas plant. The relative ease of emulsification of some of the various oils present in tar are tabulated in the original paper.

and a method is suggested for operating without making stable tar emulsions. A method of determining cracking efficiency by analyzing the tar is suggested. A method is developed for rapidly determining the per cent of water in tar emulsions.

Summary and Conclusions

Although the time allowed for the conduction of this investigation was limited to a few months the writer feels that the conclusions arrived at, and which are in the main presented here in summarized form, are justified and true:

(1) With the present system for cooling carbureted water gas and condensing the liquid products therefrom it is natural that emulsions of some sort, either stable or weak emulsions, should be formed in the normal operation of a gas works.

(2) The stability of the emulsions formed is increased as the completeness of oil cracking is decreased.

(3) The relative completeness of the cracking of oil in different sets in a particular plant can be determined by testing the tars as indicated.

(4) The free carbon of the tar is the emulsifying agent causing the production of emulsions in which water is the dispersed phase.

(5) The obstinacy or stability of emulsions is not the same for all tars with a given percentage of free carbon. Expressed differently: the emulsifying effect of carbon is not the same for each of the oil constituents of water gas tar.

(6) *Other factors being practically the same,* the tendency to form stable emulsions, due to the presence of a definite amount of carbon, is greater as the percentage of uncracked oil in the tar increases. By uncracked oil is meant the oil which appears as a clear oil residue on sulphonating the distillate oil from tar.

(7) In ordinary operation the most stable emulsions are formed of those tars which contain the largest percentage of saturated oils. Thus the chemical composition of the tar has considerable to do with the rate of separation of the tar emulsions. A change of chemical properties is of course accompanied by a change in physical properties.

(8) Naphthalene, naphthalene compounds, and other unsaturated high boiling compounds of like nature obtained by the distillation of water-gas tar, are not so readily held in stable emulsions containing a high percentage of water, due to the presence of free carbon, as are the paraffin oils.

(9) In ordinary operation the factors tending to increase the completeness of oil cracking also tend to increase the percentages of naphthalene, high boiling tar oils and free carbon, and to raise the specific gravity of the tar, which change is accompanied by a decrease in the percentage of paraffin oils in it.

(10) The relation of specific gravity to the rate of separation or de-emulsification has been discussed. While it is true that tars with a specific gravity approximately 1.0 tend to form stable emulsions, it is evident that the specific gravity is merely an indication of a relatively high content of paraffins or of other chemical differences which favor the formation of obstinate emulsions, and is in itself not a primary contributing cause of emulsion difficulties.

(11) There is an optimum amount of carbon favorable to the formation of

stable emulsions containing a high percentage of water. This optimum percentage is not the same for all oils and tars.

(12) When carbon black, powdered coal or the like is mixed with tar or tar oils and water, in greater quantities than the optimum amount, there is a distinct tendency for the agglomeration and separation of the dispersed phase (water). If such a material is added in large enough quantities the separation of water is practically complete. In this instance the tar and carbonaceous material exist as an amalgam in the form of a putty-like mass.

(13) The quantity of carbon or carbonaceous material necessary to completely expel the water depends, primarily, but not entirely, on its fineness of division. Figures are given for powdered bituminous coal and carbon black.

(14) The amalgam may be utilized as liquid fuel by adding to it sufficient dry tar or other liquid fuel to give it the desired fluidity.

(15) The factors affecting the production of and rate of settling of tar emulsions have been discussed, i.e., viscosity, temperature, etc.

(16) The primary causes for incomplete cracking of oil in the production of carbureted water gas are apparently as follows:

(a) Low temperature in the checker chambers.
(b) Dirty checker brick (carboned brick).
(c) Insufficient time of contact of the oil vapors with the hot checker brick. This may be due to injecting the oil too rapidly, to the method of checkering or to the particular style of set in use.
(d) Changing the kind and quality of oil used without altering other variables to suit the new condition.
(e) Unsuitable spray nozzle. One not adjusted to give the proper distribution of oil under the prevailing conditions of pressure and rate of oil input.

(17) Methods of making the various tests and analyses, or references to them, have been given.

(18) A rapid and inexpensive method for the determination of water in tar emulsions has been developed and is discussed in the appendix.

New Members

Gas Companies		
Greenfield Gas Light Co.,	F. C. Butler, Mgr.	Greenfield, Mass.
Citizens Gas & Electric Co.,	C. H. Prichard, M. Dir.	Nantucket, Mass.
Central Maine Power Co.,	G. S. Williams, Supt.	Augusta, Maine.
Jefferson City Lt., Ht. & Pr. Co.,	H. S. Kilby, Gen. S.	Jefferson City, Mo.
Madison County Lt. & Pr. Co.,	C. T. Wheat, Supt.	Carlinville, Ill.
Grand Island Gas. Co.,	R. H. Vieregg, G. Mgr.	Grand Island, Nebr.
Southern Gas Improvement Co.,	S. T. Moore, Mgr.	Henderson, N. C.
Rocky Mount Public Works., Gas Dept.,	L. M. Jordan, Supt.	Rocky Mount, N. C.
Tiverton Gas Company,	Wm. E. King, Mgr.	Tiverton, R. I.
Monroe Light & Fuel Co.,	H. M. Place, Mgr.	Monroe, Wisconsin.
Manufacturers		
Amherst Fuel Co.,	C. W. Henry, G. S. Mgr.	Cincinnati, Ohio.
Crane Co.,	E. H. Raymond, V. P.	Chicago, Ill.

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Rate Structure—J. D. Shattuck, Chester, Pa.
Standard Gas Appliance Specifications—W. T. Rasch, New York, N. Y.
United States National Committee of the International Commission on Illumination, Representative on—Howard Lyon, Gloucester, N. J.
Nominating Committee—A. P. Lathrop, New York, N.Y.

National Safety Council

HOW many safety men are employed by gas companies and other public utilities to protect both their employees and the general public from the accident hazards in connection with their business? This will be revealed when the National Safety Council completes a census which it is now taking of all the persons engaged in safety and industrial health work in the public utility industries, as well as all persons engaged in these activities in every other industry and in public safety work also. The public utility companies have unusual accident problems to deal with because of their contact with the public in addition to the hazards to men employed in their plants, so it is expected they will stand high on the list for the number of safety men they have working. To date it has never been established definitely how many persons in the public utility industries are engaged in accident prevention and industrial health work, or how the various types of utilities compare with each other or with other industries in this respect.

This is the first time that any attempt has ever been made to list the thousands of people who are now professionally engaged in the safety movement. The census will include not only members and employees of members of the National Safety Council, but all persons engaged in safety and industrial health activities and not connected with the council at all. Many of the largest gas companies are members of the council.

Every reader of this publication who is professionally engaged in industrial or public accident prevention or industrial health work—whether he is devoting all or only part of his time to accident prevention—is urged to assist in the taking of this census by sending to the National Safety Council, 168 North Michigan Avenue, Chicago, his name and the other data requested in the council's census form which is reproduced on the following page.

EDITOR'S NOTE:—

It is expected that when the job of taking this census is completed there will be registered at the headquarters of the National Safety Council in Chicago the name of every man and woman responsible for the safety work of every industrial plant, public utility, municipality, and every organization which devotes any part of its efforts towards the promotion of either industrial or public safety, in the United States. Up to the present date there has not been in existence any data to show how many persons are engaged in this work either in any single industry or class or in the country as a whole.

Industry in general and the nation at large will profit from the results of this census. It will enable the Council to quickly find speakers on industrial and public safety for any occasion in any locality; authors for special articles on accident prevention; writers of safety textbooks; lecturers on accident prevention and industrial health work for universities and colleges. The Council at present continually receives requests from industrial companies, municipalities, civic associations, clubs, schools, colleges, and other organizations for help in finding speakers or writers on safety subjects. The census records will greatly increase the facilities of the Council for filling such requests.

Following is the form which all safety workers are requested to fill in and send to the National Safety Council, 168 N. Michigan Avenue, Chicago.

Name .....

Company or organization .....

City ..... *State* .....

Nature of company's business .....

Is Safety your principal work? .....

Please check other activities you engage in:

Fire protection	*Legal*
Health and sanitation	*Insurance*
Workmen's compensation and claims	*Welfare*
General executive (such as manager or superintendent)	*Education*
Engineering (other than safety)	*Industrial relations*

How long have you been in your present position? .....

Technical or other special education? .....

Signed .....

Title .....

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Accounting for the Sale of Securities to Consumers

M. F. REEDER, The Peoples Gas Light & Coke Co., Chicago, Ill.

I

WHEN outlining a system of accounts for public utility companies which are selling their securities to the consumer-investor, the first essential is that the scheme must conform with fundamental accounting principles. Three points should always be kept in mind; the accounting system must be simple, efficient, and economical.

Accounting problems with reference to stock sales do not begin until sales are actually made, but the accounting division of the investment department should be carefully organized before the sales campaign begins. The selling organization may be very successful, and succeed in securing many new stockholders for the utility, but much of the good-will created by the sales force will be dissipated by inefficient handling of subscribers' accounts.

The contract signed by the subscriber will determine to a great extent the accounting routine that must be followed. Subscriptions are usually taken on either a "cash-payments" or a deferred-payment plan. A common form of contract agreement between the consumer-investor, and the utility offering its securities is as follows:

"Under the partial payment plan, the purchaser shall pay $10.00 per share at time of subscription, $10.00 per share per month thereafter until purchase price is fully paid, except that the last monthly payment shall be $.....

"So long as there is no default in the

payment of any of the installments when due, the purchaser shall be credited upon the books of the company with interest on each installment calculated at the rate of 6 per cent per annum from the date upon which the installment is paid until the beginning of the quarter in which the last installment is paid. The interest so credited to the purchaser shall be paid to him at the time of the delivery of the certificate representing the stock purchase. The dividend for the quarter in which his last payment is made shall accrue to the purchaser."

II

Accounting for sales of stock under the "cash-payment" plan presents few, if any, difficulties as the transaction will be an exchange of cash for capital stock. The essential accounting problem is to establish a control over cash received, and the issue of the stock.

General ledger accounts should be few in number, and act as controlling accounts for the subsidiary ledgers. The following general ledger accounts are suggested as essential under any sales plan;

Subscriptions Receivable.
Capital Stock Subscribed.
Cash.
Commissions.
Interest Accrued.
Capital Stock.

As a matter of record, all sales—regardless of the payment plan—should be handled through the general ledger account, "Subscriptions Receivable."

III

Accounting for "deferred payments" will, in contrast to "cash payments," involve a great amount of work on the part of the accounting department.

In order to minimize the necessary work and secure records at the earliest possible moment, it is preferable that bookkeeping machines be used for making up all accounting records, the different record forms being selected with that idea in view.*

The following records, in addition to the general ledger, must be kept by the accounting department: (1) a sales journal, (2) a sales report, (3) a salesmen's commission ledger, (4) a subscriber's ledger. These records are strictly subsidiary books except the sales journal; this is used as a book of original entry, monthly posting being made therefrom to the general ledger.

Having decided upon the records to be kept, the following routine will provide the information required for entry therein.

The subscription contracts, together with the initial payments, are delivered daily by the sales department to the company cashier. The cashier must verify the payments and enter the total cash received in his cash book. All contracts are sent by the cashier to the accounting department stock subscription clerk. He gives each contract a number and also notes on the contract the amount of commission due the salesman. If interest is credited to the subscriber at the time installments are received, that also should be calculated and entered on the contract by the stock subscription clerk. He takes a record of customer's name, address, and contract number. This information is forwarded to the addressograph department, where plates are made up for each subscriber. Form letters, thanking the subscriber for his subscription, etc., are available, and the

*The routine as outlined herein assumes that bookkeeping machines will be used, but when they are not available forms may be selected which will be suitable for ordinary procedure.

addressograph is used to address one of these letters to each new subscriber. The addressograph department also places the customer's name, address, and other information, on a customer's payment receipt card. The receipt card, together with the letter, are returned to the accounting department, where they are checked and mailed to the subscriber.

As soon as the stock subscription clerk secures from the contracts the information which he desires, they are forwarded to the bookkeeping machine operators. The machines handle type as well as figures, and the following accounting records are set up, the information being taken from the contract.

1—A sales journal.
2—A sales report.
3—A salemen's ledger.
4—A subscriber's ledger.

The forms used for the above records should be so arranged as to provide columns for all information desired. By using uniform spacing and columnar arrangement, together with ink carbons, it will be possible to make up the sales journal, salesmen's ledger, and customer's ledger with one posting on the bookkeeping machine. This applies to columnar postings only, for the setup of the headings on each record will be entirely different. As many copies of the daily sales report should be made as are necessary for distribution to executive officers desiring a report on sales made.

The salemen's commission ledger and subscribers' ledger pages should be filed in trays either by name or contract number, whichever method is most convenient, for future reference.

All entries made should be verified and proven daily, then as soon as the work is completed the sales reports will be ready for the executive officers concerned. Arrangements should be made so that each day's work is promptly taken care of; otherwise the work will accumulate, and as a result the system will not function properly.

The accounting records are now complete and the subscription contract should be filed in the department files for reference purposes, or to be used at a later date for compiling special statistical reports which may be called for by executives of the company.

If, however, the utility has a special statistical department, the contracts are forwarded to the department for the compilation of statistical data.

IV

The contract provides, "for the payment of interest, to the subscriber on all installments paid, from the date said payment is made until the beginning of the quarter in which the last installment is paid. This amount is to be credited to the customer as it accrues, and will be paid to him when the final stock certificate is issued, provided, etc."

Accounting procedure which will fulfill this provision of the contract tends to complicate the subscriber's account, without any material advantage to him. A payment period extending over nine months will involve nine interest computations and corresponding credits to the customer's account.

The above procedure can be materially simplified if the contract provides that interest on installments will be paid up to the date when the last payment is received.

By using the coupon method for figuring interest only one computation

and credit to the customer's account will be necessary. This computation will be made to the date on which the last installment is paid.

The subscriber will receive nine months' interest on his first payment; eight months' interest on the second installment, etc. The total interest for all installments is then credited to the subscriber's account and a check will be drawn in his favor for that amount.*

If strict accounting principles are followed, the first method for computing interest should be used. If, however, the simplified method is used, an account called Installment Interest Accrued should be set up on the general ledger, to be credited monthly with an estimated amount equal to the interest accruals on installments. When subscribers' interest checks are mailed this account will be debited with the amount thereon, the difference between estimated and actual interest being adjusted to loss and gain.

V

All deferred payments, which follow the initial payment received with the subscription contract, are received by the cashier of the investment department.

Payments should be accompanied by the subscriber's receipt card. The cash receiver enters on the subscriber's receipt card the date, amount received, and opposite same his initials. The card is then returned to the subscriber.

A cash receipt ticket is made up showing subscriber's name, payment number, account number, and the amount received.

All cash tickets are recapitulated on a daily cash report. This report, together with the cash receipt tickets, is forwarded to the accounting department. The cash recapitulation is checked against the individual cash receipt tickets. If no errors are discovered the tickets are given to the bookkeeping machine operators to be posted to the credit of the subscribers' accounts.

The use of a posting machine will practically eliminate errors, and will materially speed up posting; as a result each day's work may be verified as soon as each day's work is completed.

VI

When the last installment is paid the interest is computed as outlined, and a check for the amount due is drawn in favor of the subscriber. The interest as calculated is credited to his account, and when the check is mailed the subscriber's account is debited.

A requisition is drawn on the company transfer agent for a stock certificate. The certificate is drawn in favor of the subscriber by the transfer agent, and forwarded to the investment department.

The subscriber is notified that the certificate of stock has been issued, and he may receive same upon surrender of his subscriber's receipt card at the company office. His subscription account is now debited with the stock issued and the transaction is closed. The subscriber now appears as a shareholder of record.

Other features which make the system practical are:

1—The daily sales report to executives.
2—Daily balancing and verification of accounts.
3—The elimination of posting errors by the use of mechanical posting and recording devices.
4—The elimination of illegible handwriting as an annoying factor in accounting records.

*The above method of computing and paying interest is used by a prominent Chicago Utility Corporation which has had wide experience, and has been very successful in financing by means of stock sales to consumers.

Accountants to Concentrate on Consumers Accounting Systems

A VERY good attendance was had at the first meeting of the Managing Committee of the Accounting Section held at Association Headquarters.

There were present, Messrs. Ewald Haase, chairman, J. W. Heins, vice-chairman, H. C. Davidson, W. A. Doering, H. J. LaWall, James Lawrence, W. J. Meyers, W. A. Sauer, Wm. Schmidt, Jr., E. C. Scobell, W. G. Sterrett, P. A. Wilson, and H. W. Hartman, secretary.

It was the unanimous decision that the Section could render the most constructive assistance to its members by concentrating on the solution of one fundamental problem this year and threshing it out to a conclusion. After full consideration the Managing Committee selected the subject of consumers accounting systems as one of the most fundamental problems on which the Section could gather information both from the standpoint of:

(a) Improving the service companies render to their consumers.

(b) Reducing the cost of adequately rendering such service.

It was brought out that detailed studies of various systems of consumers accounting were being made by several of our larger companies at the present time. The results of such studies and the comparative efficiencies of new and improved systems actually installed will be included in the Accounting Section's committee report for thorough discussion and analysis at the Convention.

W. A. Doering of the Boston Consolidated Gas Company has been appointed Chairman of the Committee on Consumers Accounting and in a preliminary outline has tentatively included the following in the matters to be considered by his Committee:

Application Department
Consideration of use and form of application cards and possible modifications.

Bookkeeping Department
Relative advantages of the
Bound Ledger (commonly called Boston Ledger)
Loose Leaf Ledger
Card Systems, or
No Ledger at all

Relative advantages of
Machine Bookkeeping versus Hand Method
Machine Billing versus Hand Method
Machine Bookkeeping and Billing in one operation

Collection Department
Relative economy of mailing bills to consumers or of delivery by collector who would make collection on presentation of bill. Advantages of the tickler coupon used in case of delinquent payments.

The above, of course, can only be considered as a preliminary outline of the broad field of economy and improvement in the handling of consumers' accounts which is open to the Committee's consideration. It was agreed that members of the Committee should arrange to visit gas companies where new and improved systems have been installed to personally inspect and study the results and economies accomplished. Representatives present at the meeting of companies who have recently been making a study of this problem pledged their full co-operation to the Committee, and it is hoped that all our members having knowledge of developments in the Committee's field will communicate to the Chairman, W. A. Doering, c/o The

Boston Consolidated Gas Company, Boston, Massachusetts.

Continuous Inventory of Fixed Capital

H. C. Davidson, Consolidated Gas Company of New York, was appointed Chairman of this Committee and since the meeting good progress has been made in the Committee's organization. The Committee's report this year will include a description of the various systems of continuous inventories at present in operation by member companies, the uses to which they have been put, and the comparative advantages of the various methods of keeping the inventories up to date. For this purpose there are being secured as members of the Committee accountants connected with companies having continuous inventories in force. A discussion of the practical advantages of the inventory both in commission cases and in the writing off of property abandoned will be included in the report.

State Representatives and Contributions to Monthly

W. A. Sauer of The Peoples Gas Light and Coke Company was appointed Chairman of the above Committee which will continue its valuable work of keeping members posted as to the accounting and commercial office practices of gas companies. With a representative in practically every state and district of the country the Committee is in a position to secure authoritative information on any question in its field and our members are again reminded that a letter of inquiry to Association Headquarters or to the Chairman is all that is required to place the services of this nation-wide Committee at their disposal.

Cost of Main Extensions

The cost of making main extensions and the determination of when such extensions are profitable is a very important consideration with many of our companies supplying growing communities. Policies in this respect, of course, are largely subject to the rules of Public Service Commissions, and a very good resume of such commission rulings was published in the November 10, 1921 issue of Public Utilities Reports Annotated. It was suggested, however, that many companies had not made a scientific analysis of the costs entering into their main extensions, and that such a study could be made by the Accounting Section with a view to evolving a formula for determining when such extensions would be profitable and warranted. H. J. La-Wall was delegated to make a study of this subject and to report at the next meeting of the Committee. It will then be decided whether the material developed will be presented as a paper at the Convention or published in the A. G. A. Monthly.

W. J. Meyers was reappointed as Chairman of the Committee on Standard Classification of Accounts, and the Committee on Fire Insurance Rates was continued with P. A. Wilson of The United Gas Improvement Company as Chairman.

The next meeting of the Managing Committee will be held in Chicago on March 14th.

ADVERTISING SECTION

A. A. HIGGINS, Chairman — B. J. MULLANEY, Vice-Chairman

CHARLES W. PERSON, Secretary

MANAGING COMMITTEE—1922

At Large

BENEDICT, C. M., Charleston, S. C.
BENNETT, J. M., Philadelphia, Pa.
HANLAN, J. P., Newark, N. J.
HUMM, A. W., New York City, N. Y.
INGLE, J. P., Haverhill, Mass.
MURFIT, W. G., Newtown, Pa.
NEWTON, F. A., Jackson, Michigan.
POTTER, CLYDE H., Los Angeles, Cal.
WELSH, W. J., Stapleton, N. Y.
WISKE, P. B., Brooklyn, N. Y.

Representing Affiliated Societies

ALLEN, GEO. W., Toronto, Can. (Canadian)
BURNS, J. J., St. Louis, Mo. (Missouri)
CHAPIN, C. H. B., New York, N. Y. (Empire State Gas & Electric Association)
FRANKLIN, S. J., Millville, N. J. (New Jersey)
FUGATE, FRANK, Detroit, Mich. (Michigan)
GOULD, WM., Boston, Mass. (N. E. Gas Eng.)
HARTOG, JOHN H., Portland, Ore. (Pacific Coast)
JASPERSON, R. O., Chicago, Ill. (Wisconsin)
LESTER, F. M., Chicago, Ill. (Illinois)
ENGLISH, A. L., Council Bluffs, Ia. (Iowa District)
MULHOLLAND, S. E., Fort Wayne, Ind. (Indiana)
ROLSTON, R. J., Philadelphia, Pa. (Pennsylvania)

Seeing Ourselves as Others See Us

By J. P. INGLE, Manager, Haverhill Gas Light Company, Haverhill, Mass.

Here is a bitter—perhaps an unjustifiably bitter—denunciation of our methods of doing business, with here and there a good laugh. Right or wrong, the author makes us take a new inventory of ourselves and our jobs in order that we may see ourselves aright. A period of serious introspection is good for all of us.

I WISH to take as my subject the old and time worn saying, "Where there is lots of smoke there must be some fire."

I think you will all admit that there is a general feeling of antagonism on the part of the public toward public utilities and although this feeling of antagonism may not be apparent at all times, it takes very little to bring it to the surface.

Knowing that this condition holds true, let us look ourselves over and see if we are in any way responsible for it.

If you should ask the manager of a gas or electric company to make a talk before the Chamber of Commerce, Rotary Club or other civic organization, he would probably seize the opportunity. He would tell the people how in the old days the motto of "The Public be Damned" held sway, but that now all of that has passed and that the utility which he has the honor to represent is one of the most benevolent, most public-spirited and most unselfish concerns in town, but alas, the most misunderstood and the most misjudged.

He would tell how the utility has invested millions of dollars in mains, new equipment and other apparatus; how the rates are always so low as never to allow more than a reasonable return on the actual value of the property; how the taxes assessed are out of all proportion to the taxes assessed on other property, and how in spite of the desire of the company and all of the employees to be as public-spirited, polite, courteous and obliging as is humanly possible, many

uninformed and rude people are always picking on his company, abusing it, calling it all sorts of hard names, and otherwise trying to "get its goat." All this he blames on the cheap politicians, who believe that in order to curry favor and get elected to office, they have only to cuss out the public utility in the town and immediately they will be swept into office on a wave of popular enthusiasm.

I ask you what is it of which the utility seems to have the most fear; the one thing that is the most railed at and cursed in all public utility conventions and meetings. You know—the professional politician. Now, I do not mean by this the cheap soap-box orator who stands on the corner and yells his head off whenever he can get an audience. But the man I mean is the man who is in politics for a living, and who always has one ear to the ground to hear the rumble of opinion and one eye on the next election.

As I see it, however, the professional politician is in very much the same position as the public utility. His business success and his prosperity depend upon his being popular in the district he serves, and if he loses the confidence of his constituents or incurs their enmity, he has a hard road ahead of him and one that is not pleasant to travel. The public utility is in exactly the same position, as anw manager can tell you whose company has lost the confidence of the people or incurred their enmity. If this politician whom we profess to look down upon and despise, is so successful, would it not be a good idea for us to look him over and see if we can discover why he is successful? Why is he always on the winning side? Why can he always keep the people with him? In other words, how can he always do so successfully the very thing that we want to do, but do not!

In the first place, the politician is always easily approached. If you want to see him, you can get right up to his office, home or the "place he hangs out" and you can "walk right in." You don't have to go first to the girl at the telephone switchboard, tell her who you are, what you want, who you represent, what your business is, and then after this data has been given, have a secretary come out and tell you in an awed and hushed voice that Mr. Jones is "in conference" at present and won't someone else do just as well. You bet you don't. You walk right in the room of George Jones, the politician, and he takes the cigar out of his mouth and says "Hello Bill, come right in. . . . How's the Mrs.? . . . . Little Bill get over the measles all right? . . . Have a cigar. . . . What can I do for you?" Then after you have had your talk with George Jones, the politician, who, by the way, always promises to try to fix up for you the little thing you want done, (and my experience has been that he generally does fix it up) he walks to the door with you and says, "Come in again when you are down this way."

A man who was recently elected an alderman came in to see me about getting a few loads of ashes to fill in a hole in the street near the Gas Works. When he left he said, "Come in to see some time when you are around the City Hall and remember my name is George. Cut out the Mister stuff—just plain George."

Another characteristic of the politician is that he is always doing something for somebody; helping somebody get a job; using his influence to get an unfortunate constituent out of jail; giving some good practical advice, if advice is needed;

helping to straighten up a misunderstanding if the political wires have gotten crossed, and always in season and out of season making votes against the day when he will need them.

On the other hand, consider the public utility. It is about as easy to break into Boston society as it is to get into the average public utility manager's office. Does he greet his visitors with the glad hand? I'll say he does not! He's afraid the caller wants to kick about a bill or sell him something. When there is no agitation on for increased rates, franchise or something else, the public utility lays low when every employee ought to be making himself solid with the community. Of course, the officials belong to the best clubs and regularly pay dues to the Chamber of Commerce. They also imagine they get close to the people by playing a little golf and they expect to win the undying gratitude of the community by contributing annually to the Red Cross, and $5.00 to the Baby Welfare League. Then, after having neglected the human element, the official sees a storm approaching and knowing that something must be done, this is what he generally does:

He hires a public relations expert to "fix things up." The expert dopes up a series of "Little Talks on Gas" to be run serially in the local newspapers, guaranteed to produce wonderful results and to wield a mighty influence in the minds of the people. Here is a list of the titles of some of the "Little Talks" all written in words of one syllable:

1. What is Gas?
2. How Gas was discovered.
3. How Gas is manufactured.
4. How Gas is distributed.
5. The Gas meter.
6. How to read your meter.
7. Materials used in manufacturing gas, showing that the cost of these materials has increased 300%.
8. Labor required in manufacturing gas with special emphasis on the fact that the employee gets 99% of all money paid to the company.
9. Dividends from sale of gas with special remarks in heavy black type showing that the stockholder only gets sweatshop wages for his money.
10. How the public can help—This Little Talk is the climax of the series and is a masterly plea, the gist of which is that for everybody to be happy, the public should rise up in their wrath and demand that the company be paid a higher rate for gas.

Now all the above facts may be true, but it is too late to lock the stable after the horse has been stolen.

Imagine the professional politician who has neglected his political fences for years, getting out a series of "Little Talks on City Administration" in words of one syllable, when it looks as if he were about to be defeated. Imagine the first one entitled "The Administration of a City"; the second one "The Board of Aldermen"; others entitled "Officers Appointed by the Mayor," "The City Hall and What Happens There," "The City Budget," etc. Imagine a politician expecting these "Little Talks" to get him reelected. It would be a huge joke. No politician would be asinine enough to perpetrate it.

Do you realize that the public utility with its employees touches practically all social, fraternal, club, church and industrial activities in the community? Do you know that if all these employees kept a weather eye open and got themselves "in solid" and each one accumulated a real circle of friends, no politician would ever dare to attack the company, for the reason that the politician wants to fight an unpopular movement or organization and never one that is strongly entrenched

and has lots of friends? Can you imagine anyone who valued his political success attacking the American Legion? He would stand about as much chance as a Republican in Georgia.

As I said before, the time to improve relations with the public is all the time, but particularly when there is no agitation against the company. The politician is busy night and day making friends. We are inclined to forget this most important part of our work and then when the storm does come, scurry around, publish "Little Talks" and rail at the ungrateful public when the fault is our own.

Although we have all heard a great many talks and have listened to hundreds of papers on the proper treatment of the public, all these papers and talks have been along very much the same line. The telephone operator is cautioned to use only a soft, melodious, and musical tone while talking over the phone. The clerks are to be polite and agreeable. The fitters and meter readers should wipe their feet before entering the home of a customer and should remember to say "Yes Ma'am" and "No Sir" and not smoke while clearing out the parlor fixture, or spit on the dining room floor. And the complaint clerk should always keep his temper and should be courteous in the extreme while convincing the customer that he is always wrong; that he must pay his bill, and that he can not get his discount as the discount period has elapsed.

As soon as the title of a paper on public relations is announced, some managers and other higher-ups ease back in their chairs, light a fresh cigar, put on an unctuous expression and say to themselves "Go to it, old boy. Teach them a lesson in good manners." But it never occurs to these managers and other higher-ups that any one will say anything about them. In other words, if the management should be criticized, it would only be in the most indirect and tactful manner.

Now, I hold the policy of the company and the attitude of the employes directly reflect the attitude of the manager or other officials in charge of the company. If the employes are rude or discourteous, the manager should look himself over before censuring the clerks.

As I see it, the public utilities are suffering from that old disease called *monopoly*. Practically all the bad practices and habits of gas and electric companies can be traced directly to the fact that they have been operating under monopoly conditions for a long term of years.

I know perfectly well that we can and do talk about how much better off is the community we serve under these monopoly conditions and how, even though we have a monopoly in our respective lines, we never let this fact influence our public policy. I believe that so far as our rates are concerned, the community is better off, but I hold that so far as our treatment of the public is concerned, we certainly have let ourselves be governed much more by the fact that we are operating a monopoly than by good business principles as practiced by first class mercantile establishments with strong competitors.

I know public utility men generally do not believe this. They have kidded themselves into believing that although they are operating a monopoly this has not affected their business policy. But although they have fooled themselves they

have not fooled the public. This is one reason why an agitation against the company can be so easily started and why people generally have very little sympathy with the company's troubles.

In order to prove my statements, I ask you to consider some of the practices of practically all gas and electric companies. In the face of these I do not see how we can claim to have entirely abandoned the monopoly attitude or the "Public be Damned" policy.

Our office and sales floor arrangements illustrate this attitude. In the front where goods for sale are on display, the public utility invariably puts its best foot foremost. The gas stoves and electric appliances offered for sale are attractively arranged; there are generally a number of easy chairs; a telephone for the use of customers and potted plants and ferns. Everything is open. Clerks are attentive and pleasant; everything possible is done to help make sales. The reason for this is that our customers do not have to buy these appliances from us. They can do without, use the old appliances or buy from some department store, plumber or electrical supply house. This is the competitive part of our business.

The rear is the part of the floor assigned to the sale of gas and electricity. Here everything is different. The public here "lines up" before grilled windows and waits its turn. They are called "applicants" and not customers. The clerks, if not actually rude, make no special effort to be pleasant. There are no rocking chairs, no potted plants, no special effort to please. This is the "Monopoly" part of the business. People must either buy from us in our own way, on our terms and in accordance with our "Rules and Regulations," or do without.

Why should we have all this grill work and put all our employes in the monopoly end of the business in "cages" if we do not need to put the clerks and salesmen in the competitive end in cages? The floor salesman is not in a cage. The information clerk is not in a cage. Yet in many offices you will find the cashier, bookkeeper and bill clerk "behind the bars."

For that matter, why have any "cages" for employes or grill work between your employes and your customers? It shows too plainly that you do not trust your customers; that you are afraid to do business with them face to face. Suspicion and distrust on one side beget suspicion and distrust on the other. Take all the grill work and cages down, starting with the cashier, and you will be surprised how it will help in your dealings with the public. After it has been down for a while you will wonder why in the world you ever put it up in the first place, and why you did not take it down sooner.

It is also the invariable practice of gas and electric companies to put all the officials and heads of departments as far away from the public as possible, so that they will not be disturbed by the common customer. The new employe who holds the lesser position is required to "serve his time" on the disagreeable job of waiting on the public or at the "complaint window." The ambition of the recruit is to hurry up and get promoted so he, too, can go to the rear, have a nice, quiet, private office where he will not be bothered by customers with grievances and requests for information.

This whole theory is wrong. Nothing is more important than our customers

and their wants. The high grade and more experienced employes should be the ones to meet the public and the less experienced and younger clerks in point of service should be kept in the background to do the routine work. Later, when they know more about the business and have demonstrated their ability to meet people, promote them out of the background to the front counter where they can meet and serve the customer.

When a prospective customer calls at your office and indicates a desire to do business with the utility, he is immediately classified as an "applicant." First he is required to sign a service "application" and then a meter "application" before he can get your product.

Now, the word "application" has a bad sound to start with. An applicant in the generally accepted meaning of the word, is a person who is making a request or asking a favor. The man who has money to spend and wishes to purchase something, wants to "trade." He does not like to be called an "applicant" and put on a plane with a beggar or a person asking favors. Yet that is exactly how we feel about him, otherwise we would call him a "customer" and not an "applicant."

Practically all gas and electric companies have so-called "Rules and Regulations." These Rules and Regulations all relate to what the customer must do in order to so conduct himself that the company will continue to give him the service that he is expected to pay real money for. They do not apply to the company, only to the customer or "applicant."

There is not a free born American citizen that does not resent the thought of anyone making Rules and Regulations for him to follow, especially when he has no voice in making these Rules and Regulations and yet he must accept them, outwardly at least, in order to secure the privilege of using gas and electricity.

Some companies put these Rules and Regulations on the reverse side of their bills, some have them framed and hung in the most conspicuous place in the office, generally alongside the cashier's "cage," some companies even have so many Rules and Regulations that they have to get out a book to contain them all. The principle of making and publishing Rules and Regulations for customers is bad. It irritates the customer, makes the clerks feel just a trifle superior and these rules are absolutely unnecessary, for the only rules that should govern the business relations of the customer and the company are the standard rules of good business and the customer knows what these rules of good business are, for he practices them with all other concerns with which he does business.

At some time in the past somebody told the public utility manager that lawyers knew how to run a public service company and the officers of gas and electric companies believed it. As a matter of fact you can find the lawyer's footprints all over the public policy and public relations work of our business and wherever their advice has been followed the public relations of a company has suffered.

The lawyer is by his training out of tune with the ideals of good public relations. His methods and practices may be all right in the courtroom, but they should be confined to the courtroom.

I know of no better example of their methods than to insert here a clipping that appeared in a recent magazine quot-

ing John Hays Hammond on the subject of the lawyer's methods.

WHAT WE PAY LAWYERS FOR

John Hays Hammond, the millionaire mining engineer, was once represented in a civil suit by an attorney who made a brilliant success of mixing everything up and losing the case.

"There are," said Hammond disgustedly, "some people who think we pay lawyers for what they know. A tragic mistake! We pay them for a highly developed genius for saying commonplace things in unintelligible English—if it is English.

"For instance, when I want to give you an orange, I say simply, 'I give you an orange.' But, if you asked a lawyer to make a record of it, he would look wise, figure how much he could charge you and collect, retire to a richly upholstered office, and, after the expiration of days or weeks, reappear with a document reading like this:

"I hereby give and convey to you, all and singular, my estate and interests, right, title, claim and advantages of and in said orange, together with all its rind, juice, pulp and pits, and all rights and advantages therein, with full power to bite, cut, suck, and otherwise eat the same, or give the same away with or without the rind, skin, juice, pulp, or pits, anything hereinbefore or hereinafter, or in any other deed, or deeds, instrument, or instruments of whatever nature or kind soever to the contrary in any wise notwithstanding."

Such a lawyer as the above once drew up a form of "Final Notice" for the Haverhill Gas Light Company. A more rude or discourteous communication could not possibly be sent from the company to one of its customers than this notice and to expect the manager to sign it and then expect him to be popular in the community is asking the impossible. The notice follows:

FINAL NOTICE

.....192

Mr. .....

You are hereby notified that unless the amount due from you to this company for gas consumed at No..... Street in Haverhill, Massachusetts is paid before noon of ..... next, the company will stop gas from entering said premises and, for such purposes, its officers, servants or workmen will enter said premises and separate and take away the gas meter thereon and disconnect the meter pipes and fittings on said premises from the mains and pipes of this company.

Respectfully yours,

HAVERHILL GAS LIGHT COMPANY.

By .....

Manager.

Amount due to .....$.....

Where service is discontinued on account of non-payment of a bill, a charge of fifty cents will be made for re-connecting.

The following notice was substituted, and while necessarily brief and to the point, is much more courteous and the phrase "or satisfactory arrangements made with us" indicates that it is not necessarily "final" and we invite the customer who cannot pay immediately to try to make some "satisfactory arrangement," so that it will not be necessary for us to remove his meter and thereby lose a customer.

.....192

Mr. .....

.....

We wish to advise you that according to the books of this company the amount due for gas used at ..... Street, amounting to $....., remains unpaid, and unless paid, or satisfactory arrangements made with us, we will be obliged to discontinue the gas service on.....

Very truly yours,

HAVERHILL GAS LIGHT COMPANY.

By .....

Manager.

Where service is discontinued on account of non-payment of a bill, a charge of fifty cents will be made for re-connecting.

One more example to show the absurdity of blindly following "printed forms" as drawn up by company lawyers. Some time ago a man while walking through the alley back of our office, stumbled over our ash can and tore the seat out of his trousers. He made a claim on the company for damages and after some negotiations the claim was settled for $2.50. This amount could not simply be paid and a receipt taken, but the standard form of release as drawn up by the company's lawyer must

be signed. The release when filled in read as follows:

KNOW ALL MEN BY THESE PRESENTS:

That I, ...John Doe.....
.....
of Haverhill in the County of Essex and Commonwealth of Massachusetts,
....for and in consideration of the sum of.... two dollars and a half ($2.50) to me paid by Haverhill Gas Light Company, a corporation organized under the laws of said Commonwealth of Massachusetts, the receipt whereof is hereby acknowledged, have remised, released and forever discharged and I do hereby, for myself and my Heirs, Executors, Administrators and Assigns, remise, release, and forever discharge the said Haverhill Gas Light Company, its past and present officers, agents, servants and employees, all of them, each of them, and any of them, of and from all debts, demands, actions, causes of action, suits, dues, sum and sums of money, accounts, reckonings, bonds, specialties, covenants, contracts, controversies, agreements, promises, doings, omissions, variances, damages, extents, executions, and liabilities whatsoever, both in Law and Equity, or which may result from the existing state of things ..... which against all, each or any of the said Haverhill Gas Light Company, its past and present officers, agents, servants and employees, the said John Doe now have, or ever had, from the beginning of the world to the day of the date of these presents.

IN WITNESS WHEREOF, I, the said ....John Doe.... have hereunto set my hand and seal this June 18th in the year of our Lord one thousand nineteen hundred and twenty.

.....JOHN DOE.....
Signature
.....JOHN SMITH.....
Witness:

We decided after considerable discussion that the above form was too "wordy," so we substituted the following. This form also was drawn by a lawyer, and it shows that even a lawyer can be brief if he really wants to.

IN CONSIDERATION of the sum of ..../100 Dollars to me ..... in hand paid by the Haverhill Gas Light Company, a corporation organized and existing under the laws of the Commonwealth of Massachusetts.

I do hereby for myself, my heirs, executors, administrators and assigns, release and discharge said Company from all claims, demands, suits, and action for damages on account of injuries to my person or property sustained as a result of accident on or about the.....day of..... 192 at or near ..... and their present or future consequences.

WITNESS my hand and seal 192 .
..... (L.S.)
..... (L.S.)
In the presence of
.....

In conclusion I would like to say that we should pattern our public policy and relations with our customers after such masters of salesmanship as Marshall Field, and John Wanamaker. Follow their lead and not the lead of the lawyer and engineer. Our rule should be when considering what we shall do, not what we "can get away with," and not what has been done for years, but what we would do if we had a competitor across the street that wanted our customers and our business and who was up to the minute in his practices and relations with the public. In other words we must at all times be "up on our toes," and bring our business methods up to date.

Here and There with the Section

THERE are now fourteen Committees on Public Utility Information reaching the editors and utility men in twenty states of the Union. Iowa is the latest to join this popular movement, Joe Carmichael, of Des Moines, having been appointed director in charge of the work. A fifteenth committee is about to be organized in Texas. C. W. Davis of the Dallas Power and Light Company is starting the ball a-rolling in his state.

Our recent newspaper story giving statistics of the manufactured gas industry for the year 1920 has been widely used all over the country. Commenting on the amount of gas produced, one newspaper says editorially: "This is an achievement, comparing it with a generation ago when mother had to wash the smoked chimneys of the kerosene oil lamps and trim their wicks daily." Another newspaper says it is hard to believe that gas records were broken last year when there wasn't any presidential campaign.

Our motion-picture film entitled "The Spirit of Service" is still going strong. Prints are now being used in Saginaw, Bay City and Flint, Michigan; East Braintree, Mass.; Fond du Lac, Wisconsin; Vancouver, B. C.; Salina, Kansas; Warsaw, Indiana; Goldsboro, N. C.; and Providence, R. I.

J. B. Wootan, director of publicity for Hodenpyl, Hardy and Company, has left New York to take up permanent residence in Chivago where he is now editing "Public Utility Investments," a monthly periodical devoted exclusively to the popular marketings of the securities of public utility companies. It was Mr. Wootan who got the motion-picture league men of Michigan to admit our film into that state.

Our little good-will building booklet entitled "Truths About the Meter," has hit a new record of 264,350 copies printed and 235,750 copies delivered to member companies. The Rochester Gas and Electric Corporation has just ordered a second lot of 10,000.

A study of the 1920 statistics of gas company members from the standpoint of advertising, shows that 117 companies spent $1,122,000 for new business development and $348,000 for advertising. We are going to look further into this matter for the purpose of suggesting to companies what should constitute a reasonable annual appropriation for advertising.

In the near future we hope to have two new motion-picture films in the field. One is going to deal with service, and the other will depict in popular technical form the engineering side of the business. Actual work on the two films has started.

Chairman Higgins, of this section, and Floyd W. Parsons, of the Gas Age-Record, recently gave talks on advertising before the Gas Sales Association of New England. We thought this would be a good opportunity to let the New England newspapers know how we feel on the subject of advertising and we prepared newspaper abstracts of their addresses and sent them on to J. B. Groce of the

New England Committee who, in turn, distributed them to his newspaper friends. Not only did the newspapers use our articles but several of them printed editorials a column or more long. This is the kind of publicity that is putting the industry on the map.

Incidentally, we have checked up on results of our convention publicity and find that newspapers in every State in the Union except Alabama made generous use of our material. Even the newspapers of Canada and Alaska came across in fine style.

"Talking it Over With the Gas Man," is the title of a series of advertisements W. J. Baldwin, publicity manager for the New Orleans Railway and Light Company is running in the local papers. The advertisements tell the public how they can help improve the gas service and several are illustrated.

On our Managing Committee, we have a veteran newspaper man, James M. Bennett, of the U. G. I. company in Philadelphia. Following our last meeting, Mr. Bennett returned to Philadelphia and ran into one of his old friends on the Public Ledger. He told him about some of the things we are trying to do in the public relations line and the result was that next day the Ledger carried a nice little account of the meeting.

We are working up material for a series of booklets on courtesy, etc., for distribution to gas company employees. We are trying to get away from the usual dictatorial, "preachy" style of such booklets and talk with employees instead of at them. We will have something definite to report on this pretty soon.

The illustrated lecture on gas is just as popular as ever. Those who have used it recently are: C. E. Paige, Worcester, Mass., H. F. Hodge, New Britian, Conn., Charles A. Learned, Meriden, Conn., and E. L. Milliken, Woonsocket, R. I.

F. J. Kennedy of the West Gas Improvement Company is on the way to New Zealand and is taking along with him a print of our motion-picture film which he purchased outright from us.

On all gas bills of the Northern Indiana Gas and Electric Company there is this notice printed in bright, red ink so that it will be seen and heeded: "Service: You are entitled to good service and we want you to have it. If your gas flame is not blue but yellow and smoky, gas is being wasted and burners should be adjusted to admit more air. We are glad to do this without charge." Fine work, Mr. Mulholland!

Do newspaper editors want news about the gas industry? We'll say so. Only yesterday we received three full-column convention stories published by dailies in the middle West. Just think of it! The A. G. A. convention was held in Chicago last November. To us it is now ancient history. Yet the newspapers are still publishing accounts of what took place at that time.

In the early future we hope to have in the hands of our members a pamphlet describing ways and means of selling securities locally. Using the experiences of others, we want to work up a model plan that can be followed more or less closely by those who desire to dispose of their junior securities to their customers.

"Threescore Years and Ten"

How does the average man spend his life? About as follows, says Collier's:

Sleeping . . .	23 years	Eating . .	6 years
Working	19 years	Traveling . . .	6 years
Amusement	9 years	Illness	4 years
Religious devotion	1 year	Dressing . . .	2 years

That's where the time goes to. But why not an item on *Waiting;* one showing the time spent, the time lost, in waiting for one thing or another? It's a pretty big item, for with all our conveniences we can count on the fingers of one hand *the things we do not have to wait for.*

Try to think of one or two. Among the first to come to your mind will be one that serves you faithfully each day; that comes direct to you instead of your going to it; that responds instantly to your every demand; that at once eliminates all waiting by being constantly on tap—*your gas service!*

(Insert the name of your Company here)

MEMBER OF THE AMERICAN GAS ASSOCIATION

Good Will Advertisement Number 23

Associations Affiliated with A. G. A.

Canadian Gas Association

Date of Affiliation—Mar. 25, 1919
Pres.—C. S. Bagg, Montreal Light, Heat & Power Co., Montreal, Que.
Sec.-Tr.—G. W. Allen, Consumers' Gas Co., Toronto
Conv., Hamilton, Ontario, Aug. 24-25.

Empire State Gas and Electric Association

Date of Affiliation—Nov. 21, 1919
Pres.—E. H. Rosenquest, Bronx Gas & Electric Co., Bronx, N. Y.
Sec.—C. H. B. Chapin, Grand Central Terminal, New York, N. Y.
Conv., 1922

Illinois Gas Association

Date of Affiliation—Mar. 19, 1919
Pres.—H. H. Clark, 325 Peoples Gas Bldg., Chicago, Ill.
Sec.-Tr.—R. V. Prather, 305 Illinois Mine Workers Bldg., Springfield, Ill.
Conv., Hotel Sherman, Chicago, Ill., Mar. 15-16, 1922.

Indiana Gas Association

Date of Affiliation—April 24, 1919
Pres.—Morse Dell Plain, No. Indiana Gas & Elec. Co., Hammond, Ind.
Sec.-Tr.—E. J. Burke, Citizens Gas Co., Indianapolis, Ind.
Conv., 1922

Iowa District Gas Association

Date of Affiliation—May 21, 1919
Pres.—C. N. Chubb, United Light & Rwys. Co., Davenport, Ia.
Sec.-Tr.—H. R. Sterrett, Des Moines Gas Co., Des Moines, Ia.
Conv., 1922

Michigan Gas Association

Date of Affiliation—Sept. 18, 1919
Pres.—J. A. Brown, Hodenpyl, Hardy & Co., Jackson, Mich.
Sec.-Tr.—A. G. Schroeder, Grand Rapids Gas Light Co., Grand Rapids, Mich.
Conv., 1922

Missouri Association of Public Utilities

Date of Affiliation—June 18, 1920
Pres.—H. Spoehrer, Union Elec. Lt. & Pr. Co., St. Louis, Mo.
Sec.-Tr.—F. D. Beardslee, 315 N. 12th St., St. Louis, Mo.
Wiley F. Corl, Chmn. Affiliation Com., Missouri Utilities Co., Mexico, Mo.
Conv., 1922

New England Association of Gas Engineers

Date of Affiliation—Feb. 19, 1919
Pres.—V. E. Bird, Connecticut Power Co., New London, Conn.
Sec.-Tr.—J. L. Tudbury, Salem Gas Light Co., Salem, Mass.
Conv., 1923

Gas Sales Association of New England

Date of Affiliation—Oct. 1, 1919
Gov.—H. J. Pettengill, Jr., Blackstone Valley Gas & Electric Co., Pawtucket, R. I.
Sec.—M. Bernard Webber, 150 Congress St., Boston, Mass.
Annual Meeting, 1922

New Jersey Gas Association

Date of Affiliation—April 25, 1919
Pres.—H. H. Newman, Public Service Gas Co., Trenton, N. J.
Sec.-Tr.—H. E. Mason, Consolidated Gas Co. of N. J., Long Branch, N. J.
Conv., 1922

Pacific Coast Gas Association

Date of Affiliation—Sept. 18, 1919
Pres.—Henry Bostwick, Pacific Gas & Electric Co., San Francisco, Cal.
Sec.-Tr.—W. M. Henderson, 812 Howard St., San Francisco, Cal.
Conv.—Santa Barbara, Cal., September, 1922.

Pennsylvania Gas Association

Date of Affiliation—April 10, 1919
Pres.—E. L. Smith, Towanda Gas Co., Towanda, Pa.
Sec.-Tr.—Geo. L. Cullen, Harrisburg Gas Co., Harrisburg, Pa.
Conv., 1922

South Central Gas Association

Date of Affiliation—Oct. 15, 1919
Pres.—Frank L. Weisser, San Antonio Public Service Co., San Antonio, Texas.
Sec.-Tr.—S. J. Ballinger, San Antonio Public Service Co., San Antonio, Tex.
Conv., 1922

Southern Gas Association

Date of Affiliation—May 20, 1919
Pres.—L. I. Pollitt, Southern Gas & Electric Corpn., Lexington Bldg., Baltimore, Md.
Sec.-Tr.—G. H. Smith, City Gas Co., Norfolk, Va.
Conv., Greensboro, N. C., May 16-17-18, 1922.

Wisconsin Gas Association

Date of Affiliation—Mar. 25, 1919
Pres.—J. P. Pulliam, Wisconsin Public Service Co., Milwaukee, Wis.
Sec.-Tr.—Henry Harman, 182 Wisconsin St., Milwaukee, Wis.
Conv., Hotel Pfister, Milwaukee, Wisc., Mar. 22, 23, 24, 1922.

COMMERCIAL SECTION

A. P. POST, Chairman — WILLIAM GOULD, Vice-Chairman

LOUIS STOTZ, Secretary

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CAULEY, F. F., Chicago, Ill.
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CRANE, WM. M., New York, N. Y.
DAVIES, J. E., Chicago, Ill.
GOULD, WM., Boston, Mass.
LONG, H. J., New Brunswick, N. J.
MACSWEENEY, J. P., Rochester, N. Y.
POST, A. P., Philadelphia, Pa.
REINACH, H. B., New York, N. Y.
RUTLEDGE, F. J., Philadelphia, Pa.
SCHUTT, H. S., Philadelphia, Pa.
SHATTUCK, J. D., Chester, Pa.
SMITH, DORSEY R., Baltimore, Md.

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BURKE, E. J., Indianapolis, Ind. (Indiana)
CAMPBELL, E. C., Benton Harbor, Mich. (Michigan)
CLARK, H. H., Chicago, Ill. (Illinois)
COEL, WILEY F., Mexico, Mo. (Missouri)
CRAPTS, H. C., Pittsfield, Mass. (N. E. Gas Eng.)
CRANKSHAW, J. WARD, Allentown, Pa. (Pennsylvania)
DOERING, H. A., Mt. Vernon, N. Y. (Empire State)
FLAUTT, J. J., New Orleans, La. (South Central)
FORNEY, JAS. A., Charlotte, N. C. (Southern)
HANLAN, J. P., Newark, N. J. (New Jersey)
JOHNSON, W. B., Toronto, Ont., Canada. (Canadian)
ST. JOHN, JOHN, Madison, Wisc. (Wisconsin)
TAYLOR, W. H., Omaha, Nebr. (Iowa District)
WEISS, FRANK, Los Angeles, Cal. (Pacific Coast)

CHAIRMEN OF SECTION COMMITTEES ORGANIZED TO DATE

Contributions to Monthly—Representatives, Affiliated Societies
Industrial Sales—F. F. CAULEY, Chicago, Ill.
Retail Pricing—
Sales Stimulation—WM. GOULD, Boston, Mass.
Educational Pamphlets (Sub.)—J. P. HANLAN, Newark, N. J.
Merchandise Advertising (Sub.)—J. E. DAVIES, Chicago, Ill.
Window Displays (Sub.)—

Another True Story

"Our factory was established in —— over twenty years ago. We are well known there and we take our part in our civic affairs and have pride in our community. From the beginning of our business we used gas fuel for some of our industrial operations and continued and extended its use. Of course, we are not large customers—our bills run from $150 to $200 a month—but it has made me wonder about your gas business several times, for in those twenty years not one representative of the gas company has been in our establishment either to ask if the service was satisfactory or could be improved upon, or to see if there was any new business waiting there for his company. We have to have a force of men in the field to increase and develop the sales of the article which we manufacture and to give service to the people who make our business possible. I wonder in what way you fellows are any different."

This is the substantially accurate account of a remark recently made by a successful manufacturer to an A. G. A. man. Our "True Stories" are meant to point a moral.

SALES PLANS FOR 1922

Recommendations of the Managing Committee of the Commercial Section

The Managing Committee of the Commercial Section recommends that all gas companies should proceed at once with the merchandising of appliances on a basis of continuous and intensive sales effort throughout the year.

The Sales Stimulation Committee offers the following plan as the first of a number of sales suggestions which will be submitted to the industry during 1922.

It is important that the details of any selling plan be perfected well in advance and the adoption of any or all of these suggestions should mean increased profitable sales for the gas companies.

The managements of member companies are urged to authorize their Sales Managers to proceed with a definite program of sales activity from now on and to adopt as many of the ideas covered in the following plan as may be practicable.

MARCH

GAS RANGE SPECIAL SALE

Inducements

1st—Special Prices—$5.00 to $20.00 reductions.

2nd—Premiums.

(a) Pyrex glass.
(b) Aluminum ware.
(c) White enamel kitchen table.
(d) Gas iron.
(e) Toaster, cake griddle, waffle iron, top lighter.

Cost of premiums not to exceed 10% of selling price of range.

Considerable revenue from sales of gas can be secured through the installation of top lighters on existing range installations and on all new ranges which are sold. Some companies may prefer to make this a selling feature during the "Gas Range Special Sale" in place of giving the top lighter away as a premium. Figure conservatively 2,500 cubic feet per year for a top lighter on a gas range and estimate how much this business is worth to you and the advisability of special effort along this line.

3rd—Smaller Initial Monthly Payments.

From payments $2.00 initial and $2.00 monthly upwards.

4th—Thirty Days' Trial.

Satisfaction and operation guaranteed or no sale.

5th—Allowances on Old Ranges.

Policy of companies will vary in the matter of taking in old ranges. In some cases allowances have been made and the ranges scrapped. Here is an opportunity for a good window display. Show up-to-date range and by comparison one or more of the oldest ranges taken in.

A plan adopted by one company is to allow its sales representatives to purchase old gas ranges where sale of a new range is made, the company rebuilding the old range and allowing its sales representative to resell the rebuilt appliance.

6th—Or a Combination of any of the above five.

Ranges Included in Sale.

1st—First Week, ALL TYPES OF RANGES.

2nd—Second Week, ALL ENAMEL RANGES.

3rd—Third Week, HEAT CONTROL RANGES.

4th—Fourth Week, SEMI-ENAMEL RANGES, or so-called half-enamel ranges.

5th—Weekly specials instead of the above classes of ranges.

This will enable companies who carried over ranges to sell particular numbers of ranges.

Display—To Follow Weeks.

1st—All types—in windows and in show room, using preferably one make in each window display.

2nd—All enamel ranges should have a prominent place in show room,—other types should be in background. Window display should consist of all enamel range in kitchen set-up featuring other enamel kitchen furnishings such as table, cabinet and utensils.

3rd—Feature Heat Control ranges in show room, giving such ranges most prominent space. Remove other types or place them in the background. In window feature Heat Control oven range with food stuffs, real or artificial. Have demonstrations during this week showing advantage of oven cooking with heat control.

4th—Feature semi-enamel ranges so that they are the only ranges customers will see when coming into store or passing window display. In window display it is preferable to show one make of semi-enamel stove.

Arrangements can usually be made with local merchants for the use of furniture, draperies, utensils and other necessary properties needed to make proper setting for your window display. In such cases place a card bearing the name of the concern from whom such material is borrowed.

Intensive Work on Part of Sales Representative.

Coach every sales representative, both store and outside, thoroughly, providing each with typewritten sheets so that they will know exactly how the sale is being conducted. Provide them with advertising matter of the particular kinds of ranges each week and see that they systematically call on prospects to whom you have mailed advertising literature.

Place a quota on all sales representatives for sales of each type of range each week. Go over handbooks and see that they have photographs or other reproductions that will enable them to show prospective purchasers ranges. See that store salespeople really tell prospective customers the whole story. See that they try and interest customers in the best ranges the company carries. Go over prospects with representatives weekly in order to direct their work intelligently and to show the interest of the management.

Interest of all the employes of the company in the sale. Arrangements might possibly be worked out whereby commissions are split between the sales representative and the employe who provides the name of a prospect.

Work out comparative costs so that salesmen will be supplied with arguments as to the economy of gas compared with other fuels for cooking. This information will, of course, be based on local price of gas, coal or other fuels. Such information is also valuable when displayed as a window card.

Direct by Mail Advertising.

Suitable advertising matter should be mailed to all prospective purchasers, one piece each week, to be prepared by gas company or secured from manufacturers.

Manufacturers have gone to considerable trouble and expense in preparing high grade advertising material such as pamphlets, newspaper copy, show window layouts and sales suggestions. This material should be made use of to the fullest extent. Manufacturers will be found only too willing to cooperate with gas companies in supplying the necessary amount of this material, and also in having their own sales representatives assist gas companies during the sale.

Other Advertising.

Window and interior cards, signs on wagons and automobiles. Use manufacturers cards for placing in windows or stores, or have same lettered or printed locally, telling the story to those passing windows or entering store. Put printed or hand lettered banners in windows, on wagons and automobiles and in prominent places in gas company's store, on gas holders or company's fences.

One feature which has been used successfully is a baking or cooking competition, the company offering a prize, the conditions of the contest to require competitors to submit recipes used and samples of the dishes cooked, such recipes to become the property of the American Gas Association. These recipes might later be embodied in an all-gas cook book.

Newspaper Advertising.

Use newspaper advertising freely. Copy either that furnished by the manufacturers, American Gas Association, or locally prepared copy. Make this advertising specific so that customers in reading it will know that there is a real sale on—that it is worth their while to buy ranges in March.

Suggest the use of window cards—also display of newspaper advertisments used, displaying the latter in the show windows either pasted on cardboard or neatly framed.

Management.

Plan the details carefully so that stock is on hand, make the inducements worth while, show interest in the sale by talks to sales representatives weekly. Be optimistic as to the results of the sale,—it will be successful if ground work plans are laid right and you have something worth while to offer as an inducement to prospective customers to buy in an off season.

It is also considered advisable to make a canvass of the company's own employes to learn to what extent they are using gas for cooking in their own homes. In some cases companies have arrangements with their employes whereby the latter may purchase gas appliances at cost and on easy terms.

Before starting the sale call meeting of various department heads and members of the sales department and sell them the plan. Offer *Special Prizes* for meritorious sales performances, or *Extra Commissions* during the sale, or by some other similar means enlist the direct personal interest of the sales people. Get your whole organization enthused.

LET'S GO

AMERICAN GAS ASSOCIATION, 130 E. 15th ST., NEW YORK.

Display and Advertising Suggestions for Use During March Gas Range Special Sale

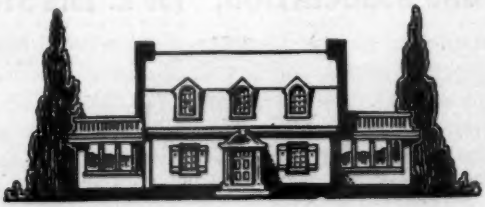
IDEAS

For Window Displays of Gas Merchandise

Every sales manager should have one of these window display collections.

This 32 page book contains a wide variety of display ideas, covering all types of appliances, holiday, seasonal and special occasions.

Price $2.00 delivered - postage accepted.



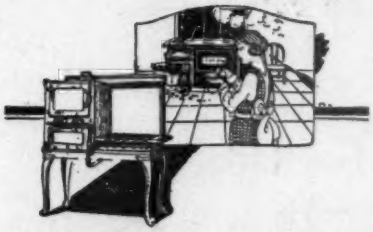
WHICH
Comfort
Recreation
Gas Range
Snowshoeing
Winter
Gas Range

End the Match Nuisance

Equip Your Range With An

AUTOMATIC LIGHTER

Just the touch of your fingers on a handy little button lights the top burners on your Gas Range when it is equipped with one of our automatic devices. No burnt match stubs to pick up—no matches to hunt for.



The Place to Start Spring Housecleaning

is in the kitchen. Your old coal stove should be the first thing to go. Its place should be taken by a modern, Cabinet style Gas Range of porcelain finish that is as easy to keep clean and spotless as a china plate.

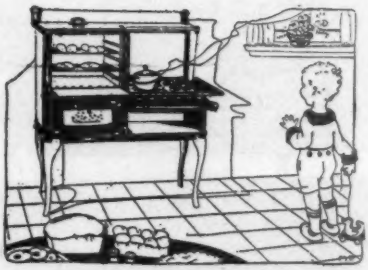
You'll take pride in your kitchen when it's Gas Range equipped. There is scarcely any cleaning to do—there's no fuel or ash to carry and no smoke or soot with Gas. A Gas Range will also cut your time in the kitchen in half.

Gas Ranges Bring Leisure Hours Into Your Home

The housewife who cooks on one of the modern Cabinet Gas Ranges that we are now showing has time to devote to things outside of her kitchen.

Contrasted with the old method of cooking on a clumsy, unsightly coal range, Gas cooking is as pleasant as a vacation at the seaside.

In the summer time, when you want to be out in the open, the woman who continues to wear herself out over an antiquated stove is doing both herself and her family a needless injustice.



In Your Kitchen— A Bright New Gas Range

There is something about the very cleanliness and simplicity of the new model porcelain finished Cabinet Gas Range that tells you things cooked upon it simply must be good.

GAS COOKING IS THRIFT COOKING

Thrift, because of saving in time, in labor, in fuel, and in foods, over all other methods. We are showing a splendid assortment of brand new Ranges. Now is the time to purchase.

Look at Your Old Gas Range —Madam

There it stands. It has served you well. Many delicious meals it has cooked for you.

Now it is old, oh so old, and worn; for gas ranges are almost human. They are born, they live, they grow old in usefulness and affection, and then, finally, they commence to decline until that day comes when life to them is a weary round; and those that loved them once become irritable at their failing session.

Finally they are thrown out, not to the dogs exactly, but to the scrap heap.

But stay! We have decided between now and February 11th to Lift the Old Gas Range from the dough of its ancient domestic and make its departure from useful service a triumphant "Vale"—a superb exit.

In behalf of old Four-Burner Gas Ranges, therefore, we make this perception.

"My efficiency is below par and my days are numbered. I have served you well these many years, and my conscience is easy at parting. But don't throw me out in sorrow; part with me with affection and profit—a profit of $10, which you will receive for me if you tell the Consumers Gas Company that you will let them have me and purchase from them a New Cabinet Gas Range."

Come and see the Cabinet Ranges at our newly opened and cosy showrooms on Adelaide St. East—almost opposite the Post Office.

New Gas Ranges for Old

|

New Gas Ranges for Old

|

You may remember in the story of "Aladdin and the Wonderful Lamp," how the wicked Magician went through the streets crying, "New Lamps for Old, New Lamps for Old."

His was a wicked motive—ours is a good one.

And, ladies, while we are not exactly giving away new ranges for old ones, we are giving $10 allowance on any old four burner gas range that is turned in to us—if a New Cabinet Range be purchased at the time.

This offer holds good until February 11th.

It is a very good offer, ladies, very good indeed. One of which you should be very happy to take advantage.

A brand new Cabinet Gas Range is such a comfort; and then again, gas ranges are much cheaper to-day than they have been for a long time.

So, you see, this is an excellent time to get one.

Come and make your selection in our new showrooms. They are quite the coziest and most comfortable shopping rendezvous near Yonge St. Just one minute's walk east on Adelaide on the South side, almost opposite the Post Office.

$10
for old gas ranges!

$10
for old gas ranges!!

$10
for old gas ranges!!!

Oyes!
Oyes!
Oyes!

$10
for old gas ranges!

$10
for old gas ranges!!

$10
for old gas ranges!!!

Oyes!
Oyes!
Oyes!

From to-day until February 11th we will allow you $10 for your old four burner gas range on the purchase price of any New Cabinet Gas Range in our store.

This is the best Cash Offer for old gas ranges in years. It is a splendid inducement to turn in your old four burner range and get a new Cabinet range.

Remember, too, that Cabinet Gas Ranges are much cheaper to-day than they have been for a long time.

Come down and spend a delightful half an hour in our warm, comfortable and cosy showrooms. They are just a minute's walk east on Adelaide Street from Yonge, opposite the Post Office. You will thoroughly enjoy your shopping here.

Conference in Chicago of the Industrial Fuel Committee

THE Industrial Fuel Committee of the Commercial Section as at present organized, consists of the following members:

F. F. Cauley, Chairman, Peoples Gas Light and Coke Co., Chicago, Ill.
W. M. Berry, Bureau of Standards, Washington, D. C.
J. J. Burns, Laclede Gas Light Company, St. Louis, Mo.
H. H. Clark, 325 Peoples Gas Bldg., Chicago, Ill.
H. M. Crawford, Pacific Gas & Electric Co., 445 Sutter St., San Francisco, Cal.
W. W. Cummings, Boston Consolidated Gas Co., Boston, Mass.
C. H. Kallstedt, Public Service Co. of Northern Illinois, Chicago, Ill.
Thomson King, Consolidated Gas, Electric Light & Power Co., Baltimore, Md.
H. O. Loebell, H. L. Doherty & Co., 60 Wall St., New York, N. Y.
W. L. Powers, Eclipse Gas Stove Co., Rockford, Ill.
R. E. Ramsey, United Gas Improvement Co., 1401 Arch St., Philadelphia, Pa.
W. T. Rasch, Consolidated Gas Co. of New York, 130 East 15th St., New York.
E. Schafer, Peoples Power Co., Rock Island, Ill.
A. A. Schuetz, Milwaukee Gas Light Co., Milwaukee, Wisc.
N. T. Sellman, American Gas Association, 130 East 15th St., New York, N. Y.
J. Weaver Smith, Citizens Gas Co. of Indianapolis, Indianapolis, Ind.
E. J. Stephany, Equitable Gas Co., Pittsburgh, Pa.
F. A. Tuttle, Public Service Gas Co., Newark, N. J.
H. E. G. Watson, Consumers Gas Company, Toronto, Ont., Canada.
H. L. Wolfe, American Gas Company, Rockford, Ill.
J. F. Reynolds, Consolidated Gas Co. of New York, 130 East 15th St., New York, N. Y.

This Committee will meet in Chicago on March 14th, together with a number of appliance manufacturers, for a general conference at which time the plans of the Committee will be discussed and a program of activities adopted.

Some of the subjects to be discussed at that time are as follows:

1. What is the industrial appliance manufacturers' attitude towards increased sales for 1922?
2. Will the industrial appliance manufacturers circularize industrial prospects if names are furnished by gas companies?
3. Promotion of gas sales by means of publicity and the question of appliance manufacturers supplying the Committee with data for this purpose.
4. Adoption of methods for bringing about closer co-operation between gas companies and manufacturers of industrial appliances.
5. Preparation of form for Industrial Contract.
6. Proper presentation of an industrial gas proposition, including blue print layout of installation and equipment.
7. Establishing and maintaining proper relations with wholesale customers.
8. Preparation of Sales Letters.
9. Preparation and issuance of operating data covering specific industrial installations.
10. Co-operation between gas interests and state manufacturers' associations.

A discussion of the above subjects will undoubtedly enable the Committee to arrive at some definite conclusion as to ways and means for assisting the gas companies in getting such large volume customers on their books.

Members who have any suggestions to offer are requested to communicate direct with the Chairman, Mr. Cauley.

MANUFACTURERS SECTION

JOHN S. DeHART, Jr., Chairman — F. A. LEMKE, Vice-Chairman

PERCY H. HALL, Secretary

MANAGING COMMITTEE—1922

At Large

BRILL, A. P., Pittsburgh, Pa.
CLOW, K. S., Chicago, Ill.
COLLINS, D. J., Philadelphia, Pa.
CRANE, WM. M., New York, N. Y.
DEHART, JR., JOHN S., Newark, N. J.
DICKEY, C. H., New York, N. Y.
FERRIS, E. J., New York, N. Y.
GREENE, J. J., New York, N. Y.
GRIBBEL, W. GRIFFIN, Philadelphia, Pa.
KNAPP, F. H., Pittsburgh, Pa.
KOPPER, WM. B., Brooklyn, N. Y.
LEMKE, F. A., Kalamazoo, Mich.
McDONALD, DONALD, New York, N. Y.
ROPER, GEORGE D., Rockford, Ill.
SHERWOOD, J. M., New York, N. Y.
STITES, TOWNSEND, Gloucester, N. J.

Affiliated Representatives

GIBSON, W. P., Toronto, Can. (Canadian)
MILLER, THOMAS D., Detroit, Mich. (Illinois)
WESTON, J. A., Lansing, Mich. (Indiana)
ROPER, GEORGE D., Rockford, Ill. (Iowa Dist.)
SCHALL, H. D., Detroit, Mich. (Michigan)
KELSEY, L. D., Brookfield, Mo. (Missouri)
NORTON, ARTHUR E., Boston, Mass. (N. E. Gas Eng.)
LONG, H. J., New Brunswick, N. J. (New Jersey)
EGLESTON, G. P., San Francisco, Calif. (Pacific Coast)
BARTLETT, C. E., Philadelphia, Pa. (Pennsylvania)
SEIDENGLANZ, C. H., Dallas, Tex. (So. Central)
SPARKS, F. F., Chattanooga, Tenn. (Southern)
McCULLOUGH, CHARLES, Milwaukee, Wisc. (Wisconsin)

CHAIRMEN OF SECTION COMMITTEES ORGANIZED TO DATE

Exhibition—JOHN S. DEHART, JR., Newark, N. J.
Nominating—GEORGE D. ROPER, Rockford, Ill.
Division of Accessories Manufacturers—J. M. SHERWOOD, New York, N. Y.
Division of Apparatus and Works Manufacturers—D. J. COLLINS, Philadelphia, Pa.
Division of Gas Range Manufacturers—WM. M. CRANE, New York, N. Y.
Division of Heating Appliance Manufacturers—K. S. CLOW, Chicago, Ill.
Division of Industrial Appliance Manufacturers—WM. B. KOPPER, Brooklyn, N. Y.
Division of Lighting Appliance Manufacturers—TOWNSEND STITES, Gloucester, N. J.
Division of Meter Manufacturers—DONALD McDONALD, New York, N. Y.
Division of Office Labor Saving Devices Manufacturers—E. J. FERRIS, New York, N. Y.
Division of Water Heater Manufacturers—A. P. BRILL, Pittsburgh, Pa.
Division of Supply Manufacturers—J. J. GREENE, New York, N. Y.

Mr. Mentzer of the Pittsburgh Water Heater Company Writes:

I note on page 38, of the January issue of the Monthly, an item, "How Much Is a Bath?" In this article you say "A bath means nothing unless you specify how many gallons of water at a certain temperature constitutes a sufficient quantity of water in which to take a satisfactory bath." Inasmuch as our advertising has featured that a certain type of water heater will supply a bath in so many minutes, we are going to take exception to this article.

One must be broad-minded enough to take the word "bath" in a universal sense. When we think of a meal we don't say we have to eat so many calories to satisfy our hunger. We might be satisfied with a ham sandwich, while another would want everything from soup to nuts; nevertheless, it would be a meal for both people. The same applies to a bath; some people may use 10 gallons, some 20, and there are some people who would stand under a shower for an hour and use 100 gallons. Nevertheless, each one would have a bath, but we will take the average and say that a bath is enough water of the proper temperature to satisfy the average person, just as a meal constitutes enough food to satisfy the average person.

Classified Directory--Manufacturers of Gas Equipment

Company Members Only, American Gas Association, Inc.

ARC LAMPS (Gas)
General Gas Light Co., New York, N. Y., Kalamazoo, Mich.
Johnson Gas Appliance Co., Cedar Rapids, Iowa
Welsbach Co., Gloucester, N. J.

ASBESTOS AND MAGNESIA PRODUCTS
Johns-Manville Inc., Madison Ave. and 41st St., New York, N. Y.

BAGS (Gas Main)
Safety Gas Main Stopper Co., 943 Fulton St., Brooklyn, N. Y.

BENCHES
Bartlett Hayward Co., The, Baltimore, Md.
Gas Machinery Co., Inc., The, Cleveland, Ohio
J. H. Gautier & Co., Jersey City, N. J.
Missouri Fire Brick Co., St. Louis, Mo.
Parker-Russell Mining & Mfg. Co., The, St. Louis, Mo.
Riter-Conley Co., Pittsburgh, Pa.
Russell Engineering Co., St. Louis, Mo.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.

BENCH IRON WORK
Banner Iron Works, 4560 Shaw Ave., St. Louis, Mo.
Bartlett Hayward Co., The, Baltimore, Md.
Davis & Farnum Mfg. Co., Waltham, Mass.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Improved Equipment Co., The, 24 State St., New York, N. Y.
Isbell-Porter Co., Newark, N. J.
Missouri Fire Brick Co., St. Louis, Mo.
Parker-Russell Mining & Mfg. Co., The, St. Louis, Mo.
Riter-Conley Company, Pittsburgh, Pa.
Russell Engineering Co., St. Louis, Mo.
Stacey Manufacturing Co., The, Cincinnati, Ohio.
Western Gas Construction Co., The, Fort Wayne, Ind.

BLAST GATES
B. F. Sturtevant Co., Inc., Boston, Mass.

BLOWERS, BOOSTERS, EXHAUSTERS
American Gas Construction Co., Newton, Ia.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Connersville Blower Co., The, Connersville, Ind.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Isbell-Porter Co., Newark, N. J.
C. M. Kemp Mfg. Co., The, Baltimore, Md.
Maxon Furnace and Engineering Co., Muncie, Ind.
Monarch Engineering & Mfg. Co., American Bldg., Baltimore, Md.
Needham Gas Appliance Co., The, 1 S. Lafayette St., New York, N. Y.
P. H. & F. M. Roots Co., The, Connersville, Ind.
B. F. Sturtevant Company, Hyde Park District, Boston, Mass.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.
Wilbraham-Green Blower Co., Pottstown, Pa.

BOILERS (Gas)
Bryant Heater & Mfg. Co., The, Cleveland, Ohio, Chicago, Ill.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Gallaher Boiler Co., Laclede Gas Bldg., St. Louis, Mo.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Hugo Manufacturing Co., West Duluth, Minn.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Kidde & Co., 103 Park Ave., New York, N. Y.
National Machine Works, Sheffield & North Ave., Chicago, Ill.
Ofeldt Gas Fired Boiler Co., Inc., The, Nyack-on-the-Hudson, N. Y.
Wales Co., The, Kalamazoo, Mich.

BOILERS (Gas for House Heating)
American Radiator Co., New York, N. Y., Chicago, Ill.
Bryant Heater & Mfg. Co., The, Cleveland, Ohio, Chicago, Ill.
Gallaher Boiler Co., Laclede Gas Bldg., St. Louis, Mo.
Kidde & Co., 103 Park Ave., New York, N. Y.
Wales Co., The, Kalamazoo, Mich.

BOILERS (Waste Heat)
American Gas Construction Co., Newton, Ia.
Bartlett Hayward Co., The, Baltimore, Md.
U. G. I. Contracting Co., The, Broad and Arch Sts., Philadelphia, Pa.

BRAKE AND FRICTION MATERIALS
Johns-Manville Inc., Madison Ave. and 41st St., New York, N. Y.

BRAZING TABLES
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Rathbone, Sard & Co., Albany, N. Y.

BRICK, FIREBRICK
Gas Machinery Co., Inc., The, Cleveland, Ohio
J. H. Gautier & Co., Jersey City, N. J.
Harbison-Walker Refractories Co., Pittsburgh, Pa.
Improved Equipment Co., The, 24 State St., New York, N. Y.
Missouri Fire Brick Co., St. Louis, Mo.
Parker-Russell Mining & Mfg. Co., The, St. Louis, Mo.
Russell Engineering Co., St. Louis, Mo.

BROILERS (Hotel)
American Stove Co., St. Louis, Mo.
Geo. M. Clark & Co., Div., Chicago, Ill.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
De Matteis Broiler System Co., Inc., The, New York, N. Y.
Michigan Stove Co., The, Detroit, Mich.
Rathbone, Sard & Co., Albany, N. Y., Aurora, Ill.
Geo. D. Roper Corp., Rockford, Ill.

BURNERS (Industrial)
American Gas Appliance Co., 108 Lawrence St. Brooklyn, N. Y.
American Gas Furnace Co., 24 John St., New York, N. Y.
Baltimore Gas Appliance & Mfg. Co., The, Baltimore, Md.

BURNERS (Industrial)—(Continued)
Century Stove & Mfg. Co., Johnstown, Pa.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Equitable Meter Co., Pittsburgh, Pa.
Grinnell Co., Inc., Providence, R. I.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Hale Manufacturing Co., Chicago, Ill.
Charles A. Hones, Inc., Baldwin, Long Island, N. Y.
Hugo Manufacturing Co., West Duluth, Minn.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Johnson Gas Appliance Co., Cedar Rapids, Iowa.
C. M. Kemp Mfg. Co., The, Baltimore, Md.
Maxon Furnace & Engineering Co., The, Muncie, Ind.
Monarch Engineering & Mfg. Co., American Bldg., Baltimore, Md.
National Machine Works, Sheffield & North Aves., Chicago, Ill.
Needham Gas Appliance Co., The, 1 S. Lafayette St., New York, N. Y.
Geo. D. Roper Corp., Rockford, Ill.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.
Tappan Stove Co., The, Mansfield, Ohio
A. H. Wolff Gas Radiator Co., The, 4 Great Jones St., New York, N. Y.

BURNERS (Lighting)
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
General Gas Light Co., New York, N. Y., Kalamazoo, Mich.
Johnson Gas Appliance Co., Cedar Rapids, Iowa
Lindsay Light Co., New York, N. Y., Chicago, Ill.
Welsbach Co., Gloucester, N. J.

BY-PRODUCT OVENS
Andrews Engineering Co., Inc. Chicago, Ill.
Belgian American Coke Ovens Corp., St. Louis, Mo.
By-Products Coke Corp., Chicago, Ill.
Foundation Oven Corp., Woolworth Bldg., New York, N. Y.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Improved Equipment Co., The, 24 State St. New York, N. Y.
Koppers Co., The, Pittsburgh, Pa.
Parker-Russell Mining & Mfg. Co., The, St. Louis, Mo.
Semet-Solvay Co., Syracuse, N. Y.

BY-PRODUCT RECOVERY APPARATUS
Bartlett Hayward Co., The, Baltimore, Md.
Foundation Oven Corp., Woolworth Bldg., New York, N. Y.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Isbell-Porter Co., Newark, N. J.
Koppers Co., The, Pittsburgh, Pa.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

CALORIMETERS
American Meter Co., Inc., New York, N. Y.
Lambert Meter Co., Inc., Bush Terminal Bldg., Brooklyn, N. Y.
Maryland Meter Works, Baltimore, Md.
D. McDonald & Co., Albany, N. Y.
Nathaniel Tufts Meter Works, 455 Commercial St., Boston, Mass.
Superior Meter Co., Bush Terminal Bldg., Brooklyn, N. Y.

CASING, TUBING (Steel)
National Tube Co., Frick Bldg., Pittsburgh, Pa.

CASTINGS (Brass, Grey Iron)
Banner Iron Works, 4560 Shaw Ave., St. Louis, Mo.
Bartlett Hayward Co., The, Baltimore, Md.
Cleveland Co-Operative Stove Co., The, Cleveland, Ohio
Western Gas Construction Co., The, Fort Wayne, Ind.

CEMENT, HIGH TEMPERATURE
Johns-Manville, Inc., Madison Ave. & 41st St., New York, N. Y.
Missouri Fire Brick Co., St. Louis, Mo.
Quigley Furnace Specialties Co., 26 Cortlandt St., New York, N. Y.

CHARGING COAL
Bartlett Hayward Co., The, Baltimore, Md.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Isbell-Porter Co., Newark, N. J.
Phillips, Lang & Co., Chicago, Ill.
Western Gas Construction Co., The, Fort Wayne, Ind.

CLOTHES DRYERS
Canton Clothes Dryer Co., The, Canton, Ohio.

CHIMNEYS (Radical Brick)
Alphons Custodis Chimney Construction Co., Marquette Bldg., Chicago, Ill.

COAL AND COKE (Conveyors, Crushers, Screeners)
Bartlett Hayward Co., The, Baltimore, Md.
R. H. Beaumont Co., 315 Arch St., Philadelphia, Pa.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Isbell-Porter Co., Newark, N. J.
Phillips, Lang & Co., Chicago, Ill.
Riter-Conley Company, Pittsburgh, Pa.
Stephens-Adamson Mfg. Co., Aurora, Ill.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.

COAL TAR PRODUCTS & CHEMICALS
Barrett Company, The, 17 Battery Place, New York, N. Y.

COCKS (Ranges, Water Heaters, Service and Meter)
A-B Stove Co., Battle Creek, Mich.
Acme Brass Works, Detroit, Mich.
Aws Mfg. Co., The, 398 Harman St., Brooklyn, N. Y.
Claus Automatic Gas Cock Co., Milwaukee, Wis.
Detroit Brass & Malleable Works, Detroit, Mich.
Geo. D. Roper Corp., Rockford, Ill.
Hays Mfg. Co., Inc., Erie, Pa.
H. Mueller Mfg. Co., New York, N. Y., Decatur, Ill.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Johnson Gas Appliance Co., Cedar Rapids, Iowa
Kitson Co., 2837 Oakford St., Philadelphia, Pa.
McRae & Roberts Co., The, Detroit, Mich.
Peninsular Brass Works, Detroit, Mich.
Roberts Brass Mfg. Co., The, Detroit, Mich.
Standard Brass Works, Detroit, Mich.

COMPOUND FOR CLEANING GAS METERS AND GAS STOVES
Standard Chemical & Supply Co., Cambridge A, Mass.

COMPRESSORS
American Gas Construction Co., Newton, Ia.
C. M. Kemp Mfg. Co., The, Baltimore, Md.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Surface Combustion Co., The 366 Gerard Ave., Bronx, N. Y.

CONDENSERS
American Gas Construction Co., Newton, Ia.
Bartlett Hayward Co., The, Baltimore, Md.
Cruse-Kemper Co., Ambler, Pa.
M. T. Davidson Co., 154 Nassau St., New York, N. Y.
Davis & Farnum Mfg. Co., Waltham, Mass.
Gas Engineering Co. Ingram Ave., Trenton, N. J.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Isbell-Porter Co., Newark, N. J.
Riter-Conley Company, Pittsburgh, Pa.
Stacey Bros. Gas Construction Co., The, Cincinnati, Ohio
Stacey Manufacturing Co., The, Cincinnati, Ohio.

Steere Engineering Co., Detroit, Mich.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

COOKING AUXILIARIES
S. Blodgett Co., The, Burlington, Vt.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Duparquet, Huot & Moneuse Co., 108 W. 22nd St., New York, N. Y.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Johnson Gas Appliance Co., Cedar Rapids, Iowa
Geo. D. Roper Corp., Rockford, Ill.
Scott Gas Appliance Co., Bond Bldg., Washington, D. C.

COUPLINGS
S. R. Dresser Mfg. Co., Bradford, Pa.

COVERINGS (Cold Pipe, Steam Pipe, Tank and Boiler)
Armstrong Cork & Insulation Co., Pittsburgh, Pa.
Johns-Manville Inc., Madison Ave. and 41st St., New York, N. Y.

CYLINDERS (Pressure)
National Tube Co., Frick Bldg., Pittsburgh, Pa.

DECALCOMANIA PRODUCTS
Meyercord Co., Inc., The, Chamber of Commerce Bldg., Chicago, Ill.

ELECTRIC CONTROLLING DEVICES
Cutler-Hammer Mfg. Co., The, Milwaukee, Wis., New York, N. Y.

ELEVATORS
Craig Ridgway & Son Co., Coatesville, Pa.
Phillips, Lang & Co., Chicago, Ill.

EXCHANGES (Heat)
Bartlett Hayward Co., The, Baltimore, Md.
Riter-Conley Co., Pittsburgh, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

EXPERT APPRAISAL
Steere Engineering Co., Detroit, Mich.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.

EXTRACTORS (Tar, Dust, Fumes)
Bartlett Hayward Co., The, Baltimore, Md.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Isbell-Porter Co., Newark, N. J.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

FITTINGS
A-B Stove Co., Battle Creek, Mich.
Acme Brass Works, Detroit, Mich.
Awa Manufacturing Co., New York, N. Y.
Bartlett Hayward Co., The, Baltimore, Md.
Banner Iron Works, 4560 Shaw Ave., St. Louis, Mo.
Claus Automatic Gas Cock Co., Milwaukee, Wis.
Davis & Farnum Mfg. Co., Waltham, Mass.
Detroit Brass & Malleable Works, Detroit, Mich.
S. R. Dresser Mfg. Co., Bradford, Pa.
Eriez Stove & Mfg. Co., Erie, Pa.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Grinnell Co., Inc., Providence, R. I.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Kitson Co., 2827 Oakford St., Philadelphia, Pa.
McRae & Roberts Co., The, Detroit, Mich.
H. Mueller Mfg. Co., New York, N. Y., Decatur, Ill.
Peninsular Brass Works, Detroit, Mich.
Roberts Brass Mfg. Co., The, Detroit, Mich.
Geo. D. Roper Corp., Rockford, Ill.
Standard Brass Works, Detroit, Mich.
Welsbach Co., Gloucester, N. J.
Western Gas Construction Co., The, Fort Wayne, Ind.

FITTINGS (Malleable Iron)
Crane Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Geo. D. Roper Corp., Rockford, Ill.

FLASHLIGHTS AND BATTERIES
French Battery & Carbon Co., Madison, Wis.

FLEXIBLE TUBING AND ENDS
Atlantic Tubing Co., Providence, R. I.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Eastman Mfg. Co., Manitowoc, Wis.

FORGES
B. F. Sturtevant Co., Inc., Boston, Mass.

FUEL BRIQUETTING
Foundation Oven Corp., Woolworth Bldg., New York, N. Y.

FUEL ECONOMIZERS
B. F. Sturtevant Co., Inc., Boston, Mass.

FURNACES
American Gas Furnace Co., 24 John St., New York, N. Y.
Century Stove & Mfg. Co., Johnstown, Pa.
Eriez Stove & Mfg. Co., Erie, Pa.
Charles A. Hones, Inc., Baldwin, Long Island, N. Y.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Johnson Gas Appliance Co., Cedar Rapids, Iowa
Maxon Furnace and Engineering Co., Muncie, Ind.
Monarch Engineering & Mfg. Co., American Bldg., Baltimore, Md.
National Machine Works, Sheffield & North Aves., Chicago, Ill.
Needham Gas Appliance Co., The, 1 S. Lafayette St., New York, N. Y.
Parker-Russell Mining & Mfg. Co., The, St. Louis, Mo.
Russell Engineering Co., St. Louis, Mo.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.

FUSES
Johns-Manville Inc., Madison Ave. and 41st St., New York, N. Y.

GAS COAL PRODUCERS
Amherst Fuel Co., Cincinnati, O.
Creech Coal Co., 733 Union Trust Bldg., Cincinnati, Ohio.
Harlan Co-operative Coal Co., Lexington, Ky.

GAS ENGINES
Bartlett Hayward Co., The, Baltimore, Md.
B. F. Sturtevant Co., Inc., Boston, Mass.

GAS ENGINE COCKS AND VALVES
Standard Brass Works, Detroit, Mich.

GAS IRONS
A-B Stove Co., Battle Creek, Mich.
Benson Mfg. Co., Chicago, Ill.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Johnson Gas Appliance Co., Cedar Rapids, Iowa
Milwaukee Gas Specialty Co., Milwaukee, Wis.
Strause Gas Iron Co., Philadelphia, Pa.

GAS LEAK INDICATORS
Taylor Instrument Companies, Rochester, N. Y.

GAS LOGS
Strait & Richards, Inc., Newark, N. J.

GAS MAIN BAGS AND GAS MAIN STOPPERS
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Safety Gas Main Stopper Co., 943 Fulton St., Brooklyn, N. Y.

GAS MIXERS
American Gas Furnace Co., 24 John St., New York, N. Y.
Century Stove & Mfg. Co., Johnstown, Pa.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Detroit Brass & Malleable Works, Detroit, Mich.
Eriez Stove & Mfg. Co., Erie, Pa.
Grinnell Co., Inc., Providence, R. I.
Hale Manufacturing Co., Chicago, Ill.
Hays Manufacturing Co., Inc., Erie, Pa.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Johnson Gas Appliance Co., Cedar Rapids, Iowa.
C. M. Kemp Mfg. Co., The, Baltimore, Md.
Maxon Furnace & Engineering Co., Muncie, Ind.
Monarch Engineering & Mfg. Co., American Bldg., Baltimore, Md.

Geo. D. Roper Corp., Rockford, Ill.
Strait & Richards, Inc. Newark, N. J.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.

GAS PLANTS (Blue)
American Gas Construction Co., Newton, Ia.
Bartlett Hayward Co., The, Baltimore, Md.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Improved Equipment Co., The, 24 State St., New York, N. Y.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

GAS PLANTS (OIL)
American Gas Construction Co., Newton, Ia.
Bartlett Hayward Co., The, Baltimore, Md.

GAS PLANTS (Carburetted Water)
American Gas Construction Co., Newton, Ia.
Bartlett Hayward Co., The, Baltimore, Md.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Improved Equipment Co., The, 24 State St., New York, N. Y.
Stacey Manufacturing Co., The, Cincinnati, Ohio
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

GAS PLANTS (Coal) (Engineers)
American Gas Construction Co., Newton, Ia.
Bartlett Hayward Co., The, Baltimore, Md.
Davis & Farnum Mfg. Co., Waltham, Mass.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Improved Equipment Co., The, 24 State St., New York, N. Y.
Isbell-Porter Co., Newark, N. J.
Missouri Fire Brick Co., St. Louis, Mo.
National Machine Works, Sheffield & North Aves., Chicago, Ill.
Parker-Russell Mining & Mfg. Co., The, St. Louis, Mo.
Riter-Conley Company, Pittsburgh, Pa.
Russell Engineering Co., St. Louis, Mo.
Semet-Solvay Co., Syracuse, N. Y.
Stacey Manufacturing Co., The, Cincinnati, Ohio
Stacey Bros. Gas Construction Co., The, Cincinnati, Ohio
Steere Engineering Co., Detroit, Mich.
U. G. I Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

GAS RANGE WATER HEATERS
Elliott Water Heater Co., Inc., 1246 Myrtle Ave., Brooklyn, N. Y.
Geo. D. Roper Corp., Rockford, Ill.

GOVERNORS, PRESSURE VACUUM & PUMP
American Gas Construction Co., Newton, Ia.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.

HEATERS (Room)
American Stove Co., St. Louis Mo.
Baltimore Gas Appliance & Mfg. Co., Baltimore, Md.
Century Stove & Mfg. Co., Johnstown, Pa.
Geo. M. Clark & Co., Div. Chicago, Ill.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Detroit Stove Works, Detroit, Mich.
Eclipse Gas Stove Co., Rockford, Ill.
Eriez Stove & Mfg. Co., Erie, Pa.
Estate Stove Co., Hamilton, Ohio
General Gas Light Co., New York, N. Y., Kalamazoo, Mich.
Grinnell Co., Inc., Providence, R. I.
J. H. Grayson Mfg. Co., The, Athens, Ohio
Hugo Manufacturing Co., West Duluth, Minn.
Illinois Specialty Mfg. Co., Bloomington, Ill.
Kidde & Co., 103 Park Ave., New York, N. Y.
Kennedy-Toombs, Inc., 12 Eleventh Ave., New York, N. Y.
Lawson Mfg. Co., Pittsburgh, Pa.
New Process Stove Co., Div., Cleveland, Ohio
Ohio State Stove & Mfg. Co., The, Columbus, Ohio
Reliable Stove Co. Div., Cleveland, Ohio
Reznor Mfg. Co., Mercer, Pa.
Roberts & Mander Stove Co., Philadelphia, Pa.
Sanitary Heating Co., The, 233-37th St., Brooklyn, N. Y.
J. B. Slattery & Bro. Inc., 108-110 Lawrence St., Brooklyn, N. Y.
Strait & Richards, Inc., Newark, N. J.
B. F. Sturtevant Co., Inc., Boston, Mass.
Van Zandt Gas Appliance Co. St. Louis, Mo.
Welsbach Co., Gloucester, N. J.
Western Gas Construction Co., The, Fort Wayne, Ind.
Wheeling Corrugating Co., Wheeling, W. Va.
A. H. Wolff Gas Radiator Co., The, 4 Great Jones St., New York, N. Y.

HEATERS (Garage)
Gallaher Boiler Co., Laclede Gas Bldg., St. Louis, Mo.
Kidde & Co., 103 Park Ave., New York, N. Y.
B. F. Sturtevant Co., Inc., Boston, Mass.
Wales Co., The, Kalamazoo, Mich.

HEATERS (Pressing and Soldering Irons)
Amercian Stove Co., St. Louis, Mo.
Bryant Heater & Mfg. Co., The, Cleveland, Ohio, Chicago, Ill.
Geo M. Clark & Co. Div., Chicago, Ill.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Eclipse Gas Stove Co., Rockford, Ill.
Estate Stove Co., Hamilton, Ohio
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Charles A. Hones, Inc., Baldwin, Long Island, N. Y.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Johnson Gas Appliance Co., Ceder Rapids, Iowa
Strait & Richards, Inc., Newark, N. J.

HIGH PRESSURE SYSTEMS
American Gas Construction Co., Newton, Ia.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Connersville Blower Co., The, Connersville, Ind.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Grinnell Co., Inc., Providence, R. I.
C. M. Kemp Mfg. Co., The, Baltimore, Md.
H. Mueller Mfg. Co., New York N. Y., Decatur, Ill.
Needham Gas Appliance Co., The, 1 S. Lafayette St., New York, N. Y.
Selas Co., New York, N. Y.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.

HOLDERS (Structural Steel Works)
American Gas Construction Co., Newton, Ia.
Banner Iron Works, 4560 Shaw Ave., St. Louis, Mo.

Bartlett Hayward Co., The, Baltimore, Md.
Cruse-Kemper Co., Ambler, Pa.
Davis & Farnum Mfg. Co., Waltham, Mass.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Riter-Conley Company, Pittsburgh, Pa.
Stacey Bros. Gas Construction Co., The, Cincinnati, Ohio
Stacey Manufacturing Co., The, Cincinnati, Ohio
Western Gas Construction Co., The, Fort Wayne, Ind.

HOT PLATES
American Stove Co., St. Louis, Mo.
A-B Stove Co., Battle Creek, Mich.
Baltimore Gas Appliance & Mfg. Co., The, Baltimore, Md.
Century Stove & Mfg. Co., Johnstown, Pa.
Geo. M. Clark & Co. Div., Chicago, Ill.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Detroit Stove Works, Detroit, Mich.
Eclipse Gas Stove Co., Rockford, Ill.
Elgin Stove & Oven Co., Elgin, Ill.
Eriez Stove & Mfg. Co., Erie, Pa.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Michigan Stove Co., The, Detroit, Mich.
Ohio State Stove & Mfg. Co., The, Columbus, Ohio
Rathbone, Sard & Co., Albany, N. Y., Aurora, Ill.
J. B. Slattery & Bro., Inc., 108-110 Lawrence St., Brooklyn, N. Y.
Tappan Stove Co., The, Mansfield, Ohio
Union Stove Works, 20 Beekman St., New York, N. Y.
Weir Stove Co., Taunton, Mass.
Wheeling Corrugating Co., Wheeling, W. Va.
A. H. Wolff Gas Radiator Co., The, 4 Great Jones St., New York, N. Y.

INDUSTRIAL FLOORING
Johns-Manville Inc., Madison Ave. and 41st St., New York, N. Y.

IRONING MACHINES
American Ironing Machine Co., 168 N. Michigan Ave., Chicago, Ill.

INCINERATORS
Estate Stove Co., Hamilton, Ohio
Odorless Incinerator Co., Philadelphia, Pa.
Ruud Mfg. Co., Pittsburgh, Pa.

INSTRUMENTS (Measuring, Testing and Recording)
American Meter Co., Inc., New York, N. Y.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, Ohio
Bristol Co., The, Waterbury, Conn.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Equitable Meter Co., Pittsburgh, Pa.
Foxboro Co., Inc., The, Foxboro, Mass.
Lambert Meter Co., Inc., Bush Terminal Bldg., Brooklyn, N. Y.
Maryland Meter Works, Baltimore, Md.
D. McDonald & Co., Albany, N. Y.
Precision Instrument Co., 21 Halsey St., Newark, N. J.
Republic Flow Meters Co., 2240 Diversey Blvd., Chicago, Ill.
Schaeffer & Budenberg Mfg. Co., The, Brooklyn, N. Y.
Steere Engineering Co., Detroit, Mich.
Superior Meter Co., Bush Terminal, Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

INSULATING MATERIALS
Armstrong Cork & Insulation Co., Pittsburgh, Pa.
Celite Products Co., 11 Broadway, New York, N. Y.
Davis & Farnum Mfg. Co., Waltham, Mass.
Johns-Manville Inc., Madison Ave. and 41st St., New York, N. Y.
Quigley Furnace Specialties Co., 26 Cortlandt St., New York, N. Y.

KILNS (For Firing Glass, China and Pottery)
B. F. Drakenfeld & Co., Inc., 50 Murray St., New York, N. Y.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Russell Engineering Co., St. Louis, Mo.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.

KILNS
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Parker-Russell Mining & Mfg. Co., The, St. Louis, Mo.
B. F. Sturtevant Co., Inc., Boston, Mass.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.

LABORATORY (Flash and Fire Test Apparatus)
Taylor Instrument Companies, Rochester, N. Y.

LIGHTERS (Ranges)
Claus Automatic Gas Cock Co., Milwaukee, Wis.
Michigan Stove Co., The Detroit, Mich.
Milwaukee Gas Specialty Co., Milwaukee, Wis.
Geo. D. Roper Corp., Rockford, Ill.
Safety Gas Lighter Co., Lynn, Mass.
J. M. Sherwood Co., New York, N. Y.
Strause Gas Iron Co., Philadelphia, Pa.
Welsbach Co., Gloucester, N. J.

LIGHTING (Fixtures)
Salem Brothers, 122 Centre St., New York, N. Y.
Welsbach Co., Gloucester, N. J.

LIGHTING (Gas Domes, Portables, etc.)
Kramer Bros. Lamp Co., 585 Broadway, New York, N. Y.
Royal Art Glass Co., 243 Canal St., New York, N. Y.
Salem Brothers, 122 Centre St., New York, N. Y.
Welsbach Co., Gloucester, N. J.

LIGHTING (Glassware)
Salem Brothers, 122 Centre St., New York, N. Y.
Welsbach Co., Gloucester, N. J.

LIGHTING (Incidentals)
Storrs Mica Co., Owego, N. Y.

LIGHTING (Mantles)
General Gas Light Co., New York, N. Y., Kalamazoo, Mich.
Lindsay Light Co., New York, N. Y., Chicago, Ill.
Welsbach Co., Gloucester, N. J.

LUX MATERIAL
Alpha-Lux Co., Inc., 192 Front St., New York, N. Y.

METAL RECEPTACLES
American Gas Furnace Co., 24 John St., New York, N. Y.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Charles A. Hones, Inc., Baldwin, Long Island, N. Y.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
National Machine Works, Sheffield & North Aves., Chicago, Ill.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.
United Lead Co., 111 Broadway, New York, N. Y.

METERS
American Meter Co., Inc., New York, N. Y.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, Ohio
Cleveland Gas Meter Co., Cleveland, Ohio
Connersville Blower Co., The, Connersville, Ind., New York, N. Y.
Cutler-Hammer Mfg. Co., The, Milwaukee, Wis., New York, N. Y.
Equitable Meter Co., Pittsburgh, Pa.
Foxboro Co., Inc., The, Foxboro, Mass.
John J. Griffin & Co., 1513 Race St., Philadelphia, Pa.
Helme & McIlhenny, 17th and Clearfield Sts., Philadelphia, Pa.
Lambert Meter Co., Inc., Bush Terminal Bldg., Brooklyn, N. Y.
D. McDonald & Co., Albany, N. Y.
Maryland Meter Works, Baltimore, Md.
Metric Metal Works, Erie, Pa.
Nathaniel Tufts Meter Works, 455 Commercial St., Boston, Mass.
Pittsburgh Meter Co., East Pittsburgh, Pa.
Precision Instrument Co., 21 Halsey St., Newark, N. J.
Republic Flow Meters Co., 2240 Diversey Blvd., Chicago, Ill.
Rotary Meter Co., 52 Vanderbilt Ave., New York, N. Y.
Sprague Meter Co., The, Bridgeport, Conn.
Superior Meter Co., Bush Terminal, Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.

METERS (Air and Steam)
Pittsburgh Meter Co., East Pittsburgh, Pa.
Republic Flow Meters Co., 2240 Diversey Blvd. Chicago, Ill.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.

METER CONNECTIONS, SEALS, Etc.
American Meter Co., Inc., New York, N. Y.
Cleveland Gas Meter Co., Cleveland, Ohio
S. R. Dresser Mfg. Co., Bradford, Pa.
Equitable Meter Co., Pittsburgh, Pa.
Helme & McIlhenny, 17th and Clearfield Sts., Philadelphia, Pa.
Lattimer Stevens Co., The, Columbus, Ohio
D. McDonald & Co., Albany, N. Y.
H. Mueller Mfg. Co., New York, N. Y., Decatur, Ill.
Nathaniel Tufts Meter Works, 455 Commercial St., Boston, Mass.
Pittsburgh Meter Co., East Pittsburgh, Pa.
Sprague Meter Co., The, Bridgeport, Conn.
Superior Meter Co., Bush Terminal, Brooklyn, N. Y.

METERS (Steam, Condensation, Gasoline, Oil, Hot and Cold Water)
Pittsburgh Meter Co., East Pittsburgh, Pa.
Republic Flow Meters Co., 2240 Diversey Blvd., Chicago, Ill.

METER PROVERS
American Meter Co., Inc., New York N. Y.
Equitable Meter Co., Pittsburgh, Pa.
John J. Griffin & Co., Philadelphia, Pa.
Helme & McIlhenny, 17th and Clearfield Sts., Philadelphia, Pa.
Lambert Meter Co., Inc., Bush Terminal Bldg., Brooklyn, N. Y.
Maryland Meter Works, Baltimore, Md.
D. McDonald & Co., Albany, N. Y.
Nathaniel Tufts Meter Works, 455 Commercial St., Boston, Mass.
Pittsburgh Meter Co., East Pittsburgh, Pa.
Superior Meter Co., Bush Terminal, Brooklyn, N. Y.

METER SEALS AND ADJUSTABLE CONNECTIONS
Lattimer-Stevens Co., The, Columbus, O.

METER SHELF
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Lattimer-Stevens Co., The, Columbus, O.

OFFICE LABOR SAVING DEVICES
Addressograph Co., Chicago, Ill.
Elliott-Fisher Co., Harrisburg, Pa.
Kalamazoo Loose-Leaf Binder Co., Kalamazoo, Mich.
Library Bureau, Boston, Mass.
Remington Typewriter Co., 374 Broadway, New York, N. Y.
Underwood Typewriter Co., 30 Vesey St., New York, N. Y.

OIL (Diaphragm)
John J. Griffin & Co., 1513 Race St., Philadelphia, Pa.
Superior Meter Co., Bush Terminal Bldg., Brooklyn, N. Y.

OVENS (Baking and Cooking)
G. S. Blodgett Co., The, Burlington, Vt.
Geo. M. Clark & Co. Div., Chicago, Ill.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Crandall-Pettee Co., The, 150 Franklin St., New York, N. Y.
Eclipse Gas Stove Co., Rockford, Ill.
Elgin Stove & Oven Co., Elgin, Ill.
Famous Oven Manufacturing Co., 110 W. 42d St., New York, N. Y.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Grinnell Co., Inc., Providence, R. I.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Meek Oven Mfg. Co., 18 W. 34th St., New York, N. Y.
Ohio State Stove & Mfg. Co., The, Columbus, Ohio.
E. E. Steiner & Co., Inc., 20 Orange St., Newark, N. J.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.
Union Steel Products Co., Ltd., The, Albion Mich.

OVENS (Annealing, Japanning, Drying, Core, etc.)
Elgin Stove & Oven Co., Elgin, Ill.
Famous Oven Manufacturing Co., 110 W. 42d St. New York, N. Y.
Gehnrich Indirect Heat Oven Co., Inc., Long Island City, N. Y.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Grinnell Co., Inc. Providence, R. I.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Johnson Gas Appliance Co., Cedar Rapids, Iowa
C. M. Kemp Mfg. Co., The, Baltimore, Md.
Meek Oven Mfg. Co., 18 W. 34th St., New York, N. Y.
Monarch Engineering & Mfg. Co., American Bldg., Baltimore, Md.
National Machine Works, Sheffield & North Aves., Chicago, Ill.
E. E. Steiner & Co., Inc., 20 Orange St., Newark, N. J.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.
Union Steel Products Co., The, Ltd., Albion, Mich.
Young Bros. Co., Detroit, Mich.

OVENS (Warming)
G. S. Blodgett Co., The, Burlington, Vt.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Eclipse Gas Stove Co., Rockford, Ill.
Elgin Stove & Oven Co., Elgin, Ill.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Meek Oven Mfg. Co., 18 W. 34th St., New York, N. Y.
Union Steel Products, Co., Ltd., The, Albion, Mich.

PACKINGS (Rods, Plunger, Piston and Flange)
Johns-Manville, Inc., Madison Ave., and 41st St., New York, N. Y.

PAINT (Outside Steel Work)
Johns-Manville, Inc., Madison Ave. & 41st St., New York, N. Y.

PHOTOMETERS
American Meter Co., Inc., New York, N. Y.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Maryland Meter Works, Baltimore, Md.
D. McDonald & Co., Albany, N. Y.
Nathaniel Tufts Meter Works, 455 Commercial St., Boston, Mass.

PIPE
Bartlett Hayward Co., The, Baltimore, Md.
Davis & Farnum Mfg. Co., Waltham, Mass.
Grinnell Co., Inc., Providence, R. I.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Riter-Conley Co., Pittsburg, Pa.
Steere Engineering Co., Detroit, Mich.
United Lead Co., 111 Broadway, New York, N. Y.

PIPE CASTINGS AND SPECIALS
Banner Iron Works, 4560 Shaw Ave., St. Louis, Mo.
Bartlett Hayward Co., The, Baltimore, Md.
Davis & Farnum Mfg. Co., Waltham, Mass.
National Machine Works, Sheffield & North Aves., Chicago, Ill.
Isbell-Porter Co., Newark, N. J.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Stacey Manufacturing Co., The, Cincinnati, Ohio
Western Gas Construction Co., The, Fort Wayne, Ind.

PIPE CLAMPS AND SLEEVES
Davis & Farnum Mfg. Co., Waltham, Mass.
S. R. Dresser Mfg. Co., Bradford, Pa.
National Machine Works, Sheffield & North Aves., Chicago, Ill.

PIPE PACKING
Celite Products Co., 11 Broadway, New York, N. Y.
Grinnell Co., Inc., Providence, R. I.
Johns-Manville, Inc., Madison Ave. & 41st St., New York, N. Y.
United Lead Co., 111 Broadway, New York, N. Y.

PIPE TOOLS (Caulking, Cutting, Tapping)
Grinnell Co., Inc., Providence, R. I.
H. Mueller Mfg. Co., New York, N. Y., Decatur, Ill.
Safety Gas Main Stopper Co., 943 Fulton St., Brooklyn, N. Y.
United Lead Co., 111 Broadway, New York, N. Y.

PLATE WARMERS
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Duparquet, Huot & Moneuse Co., 108 W. 22d St., New York, N. Y.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Geo. D. Roper Corp., Rockford, Ill.

PORCELAIN ENAMEL PARTS (Stoves, Lamps, Linings, Stamping and Spinnings)
Baltimore Enamel & Novelty Co., Baltimore, Md.
Chicago Vitreous Enamel Product Co., 1407 So. 55th Court, Cicero, Ill.
Eclipse Gas Stove Co., Rockford, Ill.
Enamel Products Co., The, Cleveland, Ohio
Porcelain Enamel & Mfg. Co., The, Baltimore, Md.
Union Steel Products Co., Ltd., The, Albion, Mich.

PORCELAIN ENAMEL PLANTS (Installers)
Porcelain Enamel & Mfg. Co., The, Baltimore, Md.

PRESSURE GAUGES
American Meter Co., Inc., New York, N. Y.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bryant Heater & Mfg. Co., The, Cleveland, Ohio
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Equitable Meter Co., Pittsburgh, Pa.
Foxboro Co., Inc., The, Foxboro, Mass.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Grinnell Co., Inc., Providence, R. I.
Maryland Meter Works, Baltimore, Md.
D. McDonald Co., Albany, N. Y.
Nathaniel Tufts Meter Works, 455 Commercial St., Boston, Mass.
National Machine Works, Sheffield & North Aves., Chicago, Ill.
Schaeffer & Budenberg Mfg. Co., The, Brooklyn, N. Y.
Superior Meter Co., Bush Terminal, Brooklyn, N. Y.
Taylor Instrument Cos., Rochester, N. Y.
Western Gas Construction Co., The, Fort Wayne, Ind.

PRESSURE GAUGES (Boiler, Naphtha, Oil, Steam, Tar)
M. T. Davidson Co., 154 Nassau St., New York, N. Y.

PUMPS
American Gas Construction Co., Newton, Ia.
Connersville Blower Co., The, Connersville, Ind.
M. T. Davidson Co., 154 Nassau St., New York, N. Y.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Nathaniel Tufts Meter Works, 455 Commercial St., Boston, Mass.
Geo. D. Roper Corp., Rockford, Ill.
Superior Meter Co., Bush Terminal, Brooklyn, N. Y.
Western Gas Construction Co., The, Fort Wayne, Ind.

PURIFIERS
American Gas Construction Co., Newton, Ia.
Bartlett Hayward Co., The, Baltimore, Md.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Cruse-Kemper Co., Ambler, Pa.
Davis & Farnum Mfg. Co., Waltham, Mass.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Gas Machinery Co., Cleveland, Ohio
Improved Equipment Co., The, 24 State St., New York, N. Y.
Isbell-Porter Co., Newark, N. J.
Riter-Conley Co., Pittsburgh, Pa.
Stacey Bros. Gas Construction Co., The, Cincinnati, Ohio
Stacey Manufacturing Co., The Cincinnati, Ohio
Steere Engineering Co., Detroit, Mich.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

PURIFIER BOX PACKING
Johns-Manville, Inc., Madison Ave. & 41st St., New York, N. Y.

PURIFYING MATERIALS
Alpha-Lux Co., Inc., 192 Front St., New York, N. Y.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York.
Gas Purifying Materials Co., Long Island City, N. Y.
J. F. Henderson Co., 1707 Commonwealth Bldg., Pittsburgh, Pa.
Iron Hydroxide Co., Paschall Station, Philadelphia, Pa.
Iron Oxide Products, Inc., 1301 S. 55th Court, Cicero, Ill.
Eph Lyon, Trust Company Bldg., Franklin, Pa.

PYROMETERS (Indicating and recording)
Foxboro Co., Inc., The, Foxboro, Mass.
Taylor Instrument Cos., Rochester, N. Y.

RADIANT HEATERS
General Gas Light Co., New York, N. Y., Kalamazoo, Mich.
J. H. Grayson Mfg. Co., The, Athens, Ohio
Kennedy-Toombs, Inc., 126 Eleventh Ave., New York, N. Y.
Roberts and Mander Stove Co., Philadelphia, Pa.
Welsbach Co., Gloucester, N. J.

RADIATORS
American Gas Appliance Co., 108 Lawrence St., Brooklyn, N. Y.
Buffalo Gas Steam Radiator Co., Gowanda, N. Y.
James B. Clow & Sons, Chicago, Ill.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Eriez Stove & Mfg. Co., Erie, Pa.
Grinnell Co., Inc., Providence, R. I.
Hugo Manufacturing Co., West Duluth, Minn.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Kidde & Co., 103 Park Ave., New York, N. Y.
J. B. Slattery & Bro., Inc., 108-110 Lawrence St., Brooklyn, N. Y.
A. H. Wolff Gas Radiator Co., The, 4 Great Jones St., New York, N. Y.

RANGES (Domestic)
A-B Stove Co., Battle Creek, Mich.
American Range & Foundry Co., Minneapolis, Minn.
American Stove Co., St. Louis, Mo.
Baltimore Gas Appliance & Mfg. Co., The, Baltimore, Md.
Bartlett & Co., Inc., Philadelphia, Pa.
Century Stove & Mfg. Co., Johnstown, Pa.
Chambers Manufacturing Co., Shelbyville, Ind.
Geo. M. Clark & Co., Chicago, Ill.
Cleveland Co-Operative Stove Co., The Cleveland, Ohio
Comstock-Castle Stove Co., Quincy, Ill.
Abram Cox Stove Co., Philadelphia, Pa.
Wm. M. Crane Co., 16 W. 32nd St., New York, N. Y.
Cribben & Sexton Co., Chicago, Ill.
Crown Stove Works, Chicago, Ill.
Dangler Stove Co. Div., Cleveland, O.
Detroit Stove Works, Detroit, Mich.
Eclipse Gas Stove Co. Div., Rockford, Ill.
Eriez Stove & Mfg. Co., Erie, Pa.
Estate Stove Co., The, Hamilton, O.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Malleable Iron Range Co., Beaver Dam, Wis.
Michigan Stove Co., The, Detroit, Mich.
National Stove Co. Div., Lorain, O.
New Process Stove Co. Div., Cleveland, O.
Ohio State Stove & Mfg. Co., Columbus, O.
Peerless Mfg. Co., The, Louisville, Ky.
Peninsular Stove Co., The, Detroit, Mich.
Philadelphia Stove Co., Philadelphia, Pa.
Quick Meal Stove Co. Div., St. Louis, Mo.
Rathbone, Sard & Co., Albany, N. Y., Aurora, Ill.
Reliable Stove Co. Div., Cleveland, O.
Roberts & Mander Stove Co., Philadelphia, Pa.
Scott Gas Appliance Co. Inc., Bond Bldg., Washington, D. C.
J. M. Sherwood Co., 154 Chambers St., New York, N. Y.
Tappan Stove Co., The, Mansfield, Ohio.
Trenkamp Stove & Mfg. Co., The, Cleveland, O.
Union Stove Works, 70 Beekman St., New York, N. Y.
Vesta Gas Range & Mfg. Co., Chattanooga, Tenn.
Walker & Pratt Mfg. Co., Boston, Mass.
Weir Stove Co., Taunton, Mass.
Wheeling Corrugating Co., Wheeling, W. Va.
A. H. Wolff Gas Radiator Co., The, New York, N. Y.

RANGES (Hotel)
American Stove Co., St. Louis, Mo.
Baltimore Gas Appliance & Mfg. Co., The, Baltimore, Md.
Geo. M. Clark & Co. Div., Chicago, Ill.
Comstock-Castle Stove Co., Quincy, Ill.
Abram Cox Stove Co., Philadelphia, Pa.
Wm. M. Crane Co., 16 W. 32nd St., New York, N. Y.
Detroit Stove Works, Detroit, Mich.
Duparquet, Huot & Moneuse Co., 108 W. 22nd St., New York, N. Y.
Eclipse Gas Stove Co. Div, Rockford, Ill.
Estate Stove Co., The, Hamilton, O.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Michigan Stove Co., The, Detroit, Mich.
Roberts & Mander Stove Co., Philadelphia, Pa.

REFRACTORY MATERIALS
J. H. Gautier & Co., Jersey City, N. J.
Harbison-Walker Refractories Co., Pittsburgh, Pa.
Improved Equipment Co., The, 24 State St., New York, N. Y.
Johns-Manville Inc., Madison Ave & 41st St., New York, N. Y.
Missouri Fire Brick Co., St. Louis, Mo.
Monarch Engineering & Mfg. Co., American Bldg., Baltimore, Md.
Parker-Russell Mining & Mfg. Co., The, St. Louis, Mo.
Quigley Furnace Specialties Co., 26 Cortlandt St., New York, N. Y.
Riter-Conley Co., Pittsburgh, Pa.
Russell Engineering Co., St. Louis, Mo.
G. F. Schmidt, Chicago, Ill.
United States Refractories Corp., Mount Union, Pa.

REGULATORS (Governors)
American Gas Construction Co., Newton, Ia.
Chaplin-Fulton Mfg. Co., The, Pittsburgh, Pa.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Connersville Blower Co., The, Connersville, Ind.
Equitable Meter Co., Pittsburgh, Pa.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Improved Equipment Co., The, 24 State St., New York, N. Y.
Isbell-Porter Co., Newark, N. J.
H. Mueller Mfg. Co., New York, N. Y., Decatur, Ill.
National Machine Works, Sheffield & North Aves., Chicago, Ill.
Reynolds Gas Regulator Co., Anderson, Ind.
Sprague Meter Co., The, Bridgeport, Conn.
Steere Engineering Co., Detroit, Mich.
Western Gas Construction Co., The, Fort Wayne, Ind.

REPAIRS (Gas Meters and Appliances)
Helme & McIlhenny, 17th and Clearfield Sts., Philadelphia, Pa.
Maryland Meter Works, Baltimore, Md.
Superior Meter Co., Bush Terminal Bldg., Brooklyn, N. Y.
Western Gas Construction Co., The, Fort Wayne, Ind.

RETORTS
Gas Machinery Co., Inc., The, Cleveland, Ohio
J. H. Gautier & Co., Jersey City, N. J.
Harbison-Walker Refractories Co., Pittsburgh, Pa.
Improved Equipment Co., The, 24 State St., New York, N. Y.
Missouri Fire Brick Co., St. Louis, Mo.
Parker-Russell Mining & Mfg. Co., The, St. Louis, Mo.
Riter-Conley Co., Pittsburgh, Pa.
Russell Engineering Co., St. Louis, Mo.
West Gas Improvement Co. of America, 150 Nassau St., New York, N. Y.

ROOFING
Johns-Manville, Inc., Madison Ave., and 41st St., New York, N. Y.

ROOF CEMENTS
Johns-Manville, Inc., Madison Ave. and 41st St., New York, N. Y.

RUST PREVENTIVE
Superior Laboratories, Grand Rapids, Mich.

SAFETY DEVICES (Gas Masks, Oxygen Breathing Apparatus, etc.)
Mine Safety Appliances Co., Pittsburgh, Pa.

SCRUBBERS
American Gas Construction Co., Newton, Ia.
Bartlett Hayward Co., The, Baltimore, Md.
Davis & Farnum Mfg. Co., Waltham, Mass.
Foundation Oven Corp., Woolworth Bldg., New York, N. Y.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Improved Equipment Co., The, 24 State St., New York, N. Y.
Isbell-Porter Co., Newark, N. J.
Koppers Co., The, Pittsburgh, Pa.
Riter-Conley Co., Pittsburgh, Pa.
Stacey Bros. Gas Construction Co., The, Cincinnati, O.
Stacey Manufacturing Co., The, Cincinnati, O.
Steere Engineering Co., Detroit, Mich.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

SELLING AGENTS
J. M. Sherwood Co., 154 Chambers St., New York, N. Y.
Kidde & Co., 103 Park Ave., New York, N. Y.

SERVICE BOXES, CLAMPS, Etc.
Davis & Farnum Mfg. Co., Waltham, Mass.
Grinnell Co., Inc., Providence, R. I.
Hays Mfg. Co., Inc., Erie, Pa.
H. Mueller Mfg. Co., New York, N. Y., Decatur, Ill.

SERVICE VALVES (Gate Valves)
Ludlow Valve Mfg. Co., The, Ft. Adams St., Troy, N. Y.

SPECIALS—CAST IRON
Western Gas Construction Co., The, Fort Wayne, Ind.

STEAM TRAPS
Johns-Manville Inc., Madison Ave. & 41st St., New York, N. Y.
B. F. Sturtevant Co., Inc., Boston, Mass.

STILLS (Benzol, Toluol)
Bartlett Hayward Co., The, Baltimore, Md.
Foundation Oven Corp., Woolworth Bldg., New York, N. Y.
Koppers Co., The, Pittsburgh, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

STOPPERS (Gas Main)
Safety Gas Main Stopper Co., 943 Fulton St., Brooklyn, N. Y.

STOVES (Confectioners, Laundry, Tailor)
American Stove Co., St. Louis, Mo.
A-B Stove Co., Battle Creek, Mich.
Geo. M. Clark & Co. Div., Chicago, Ill.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y
Elgin Stove & Oven Co., Elgin, Ill.
General Gas Appliance Co., The, 103 Park Ave., New York, N. Y.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Geo. D. Roper, Corp., Rockford, Ill.

STRUCTURAL STEEL WORKS (See Holders)

TANKS (Ammonia, Oil, Water)
American Gas Construction Co., Newton, Ia.
Bartlett Hayward Co., The, Baltimore, Md.
Cruse-Kemper Co., Ambler, Pa.
Davis & Farnum Mfg. Co., Waltham, Mass.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Gas Machinery Co., Inc., The, Cleveland, Ohio.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Metcalfe-Shaw Corp., 1304 Flatbush Ave., Brooklyn, N. Y.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Riter-Conley Co., Pittsburgh, Pa.
Stacey Bros. Gas Construction Co., The, Cincinnati, O.
Stacey Manufacturing Co., The, Cincinnati, O.
Steere Engineering Co., Detroit, Mich.
Western Gas Construction Co., The, Fort Wayne, Ind.

TAR DEHYDRATION
Metcalfe-Shaw Corp., 1304 Flatbush Ave., Brooklyn, N. Y.
Sharples Specialty Co., The, New York, N. Y.

THERMOMETERS
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Elgin Stove & Oven Co., Elgin, Ill.
Foxboro Co., Inc., The, Foxboro, Mass.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Grinnell Co., Inc., Providence, R. I.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Superior Meter Co., Bush Terminal, Brooklyn, N. Y.
Taylor Instrument Cos., Rochester, N. Y.
Schaeffer & Budenberg Mfg. Co., The., Brooklyn, N. Y.
Western Gas Construction Co., The, Fort Wayne, Ind.

THERMOSTATS
Bryant Heater & Mfg. Co., The, Cleveland, Ohio
Claus Automatic Gas Cock Co., Milwaukee, Wis.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Kidde & Co., 103 Park Ave., New York, N. Y.
Minneapolis Heat Regulator Co., Minneapolis, Minn.
B. Ryan & Co., 372 W. 15th St., New York, N. Y.
Van Zandt Gas Appliance Co., 4050 Olive St., St. Louis, Mo.
H. A. Wilson Co., The, 97 Chestnut St., Newark, N. J.

THERMO VALVES
Claus Automatic Gas Cock Co., Milwaukee, Wis.
Pittsburg Water Heater Co., Pittsburgh, Pa.
Robertshaw Mfg. Co., Youngwood, Pa.
H. A. Wilson Co., The, 97 Chestnut St., Newark, N. J.

THORIUM
Welsbach Co., Gloucester, N. J.

TRENCH WORK
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Safety Gas Main Stopper Co., 943 Fulton St., Brooklyn, N. Y.

TURBINE (Steam)
L. J. Wing Mfg. Co., 362 West 13th St., New York, N. Y.
B. F. Sturtevant Co., Inc., Boston, Mass.

VALVES
Aws Mfg. Co., The, 398 Harman St., Brooklyn, N. Y.
Bartlett Hayward Co., The, Baltimore, Md.
Bryant Heater & Mfg. Co., The, Cleveland, O.
Claus Automatic Gas Cock Co., Milwaukee, Wis.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Grinnell Co., Inc., Providence, R. I.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Improved Equipment Co., The, 24 State St., New York, N. Y.
Isbell-Porter Co., Newark, N. J.
Ludlow Valve Mfg. Co., The, Troy, N. Y.
Stacey Manufacturing Co., The, Cincinnati, O.
Steere Engineering Co., Detroit, Mich.
Western Gas Construction Co., The, Fort Wayne, Ind.

(Continued on page 185)

TECHNICAL SECTION

C. N. CHUBB, Chairman — F. C. WEBER, Vice-Chairman

H. W. HARTMAN, Secretary

MANAGING COMMITTEE—1922

At Large

BATTIN, H. S., Philadelphia, Pa.
BROWN, J. A., Jackson, Mich.
COOK, H. R., Jr., Baltimore, Md.
CORNISH, R. C., Philadelphia, Pa.
FIELDNER, A. C., Pittsburgh, Pa.
FREEMAN, F. C., Providence, R. I.
HAFTENKAMP, J. P., Rochester, N. Y.
HARPER, R. B., Chicago, Ill.
HOWARD, A. C., New York, N. Y.
JONES, E. S., Sacramento, Cal.
LUNN, C. A., New York, N. Y.
MACBETH, G. T., Mt. Vernon, N. Y.
SPERR, F. W., Pittsburgh, Pa.
WARING, GEO. H., Grand Rapids, Mich.
WILLIEN, L. J., Boston, Mass.
WING, J. F., Boston, Mass.

Representing Affiliated Societies

BATTEN, J. W., Detroit, Mich. (Michigan)
CHUBB, C. N., Davenport, Iowa. (Iowa)
CORNISH, R. C., Philadelphia, Pa. (Pennsylvania)
DUNN, F. S., Albany, N. Y. (Empire State G. & E.)
ELBERT, V. L., St. Joseph, Mo. (Missouri)
FERRIER, JAS., Atlanta, Ga. (Southern Gas)
HART, J. G., Waukegan, Ill. (Illinois)
HUMPHREYS, J. J., Montreal, Canada. (Canadian)
JOHNSON, G. M., South Bend, Ind. (Indiana)
JONES, J. B., Bridgeton, N. J. (New Jersey)
LYONS, B. F., Beloit, Wis. (Wisconsin)
PAIGE, C. E., Worcester, Mass. (N. E. Gas Eng.)
PAPST, H. M., Portland, Ore. (Pacific Coast Gas)
SEDBERRY, W. H., Marshall, Texas. (South Central)

CHAIRMEN OF SECTION COMMITTEES ORGANIZED TO DATE

Chemical—DR. J. F. WING, Boston, Mass.

Carbonization and Complete Gasification of Coal—L. J. WILLIEN, Boston, Mass.

Gas Plant and Production—GEO. H. WARING, Grand Rapids, Mich.

Distribution Design—R. C. CORNISH, Philadelphia, Pa.

Notes on Dehydration of Water Gas Tar Emulsion

C. J. HAUSCHILDT, United Light & Railways Co., Davenport, Iowa.

WE have had considerable difficulties with dehydrating water gas tar emulsions containing more than 20% of moisture and a high carbon content with ordinary methods of dehydration such as gravity tar separators; the carbon, water and tar forming an emulsion whereby it became necessary to remove the water and some of the carbon by mechanical means. We have found that the best method to do this is by putting the tar emulsion, after it has been heated to about 150° F. through a centrifugal machine where practically all of the water and most of the carbon was removed.

Experimental work done at various plants with such a machine gave some very interesting data. At the first plant where there was an accumulation of tar emulsion consisting of about 70% water gas tar and 30% coal tar and which contained a high percentage of carbon, and where the average moisture in the tar amounted to about 75%, results obtained showed that such an emulsion is very hard to dehydrate even with a centrifugal machine. Dry tar, however, can be obtained but at considerable expense, the labor cost due to the frequent changing and cleaning of rotors, making it prohibitive even though tar were selling at 6c per gallon.

The results obtained at another plant where there was a considerable amount of straight water gas tar emulsion on hand and where the moisture in the tar varied from 5% to 58% showed that water gas tar emulsion can be successfully dehydrated with a centrifugal machine

at a very low cost per gallon. At this plant a summary taken for a period of 237 hours' operation gave the following results:

Tar recovered	41075 gallons
Water removed	9270 gallons
Total tar dehydrated	50345 gallons
Avg. moisture in dehydrated tar	.5%
Avg. moisture in tar emulsion before dehydration	18.8%
Rate per hour dehydrated tar.	173 gallons
Cost per gal. of dehydrated tar	.47 cents

The cost per gallon of dehydrated tar included labor, depreciation, interest on the investment, steam for heating the emulsion and to operate the machine, oil and repairs.

Experience has shown that an emulsion of water gas tar and coal tar containing a high percentage of moisture and a high carbon content cannot be dehydrated economically with a centrifugal machine due to reasons as above stated, but where the emulsion consists of straight water gas tar regardless of the moisture content, there is no better way than to dehydrate this emulsion with a centrifugal machine. The writer in making this statement assumes that conditions existing at a plant as to storage capacity are such as to make it imperative to work up this emulsion in as short a time as possible. Where proper storage facilities are at hand, such as tower tar tanks equipped with heating facilities and where time is no object, water gas tar emulsion can be separated by gravity. With such equipment it is possible to recover tar with less than 2% of moisture.

Dry tar can be obtained by dehydration with a centrifugal machine, but this will tend to cut down the capacity of the machine. Tar containing from 1% to 2% of moisture is always in demand by the tar refiners and if such a tar is furnished them it will create a better demand for this byproduct inasmuch as the tar refiner can always depend upon getting a uniform quality of tar. It also tends to eliminate any controversy as to the moisture content, the shipper always knowing before shipping just what the moisture content will be.

It has been our experience that if the tar is properly handled from its source to storage, emulsions will not be created. By proper handling, I mean that we must use circulating water in the wash box of the machine; have the proper heats for gas making purposes so as not to make lamp black; lead all tar and water from wash box and seals to a properly constructed separator; keep this separator clean at all times; and periodically pump the tar from the separator to tower storage tanks where, should the tar contain high moisture, it will separate out by gravity.

New Type All-Cement Joint as Made by the Detroit City Gas Company

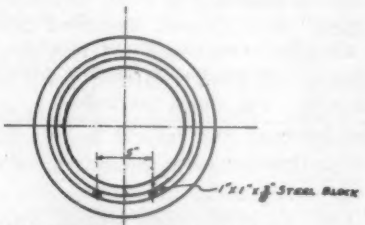
THE Detroit City Gas Company has recently constructed some large mains with the A. G. A. No. 2 Bells for cement joints. The success met with in using this joint on a short section of 16" main at the inlet of the purifying boxes at its Station "J" prompted the company to make further trial of the joint in a 4,200 foot extension of a 16" high pressure line on Kercheval Avenue.

A cross section of the joint as made on the Kercheval Avenue line is shown on Drawing No. 1. In making this joint, an attempt was made to make it as nearly all cement as possible.

The first yarning ordinarily used in lead and cement joints was dispensed with. The spigot end was centered in the bell by the use of small metal blocks, and the space between the spigot end and its seat in the back of the bell was sealed with cement grouting.

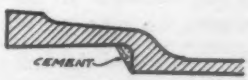
The method so far found most successful in making the joint may be described as follows:

All parts of the pipe coming in contact with the joint making material were thoroughly cleaned with a wire brush. To take the place of yarn as a backing for the cement used in making the joint, a small quantity of cement was placed



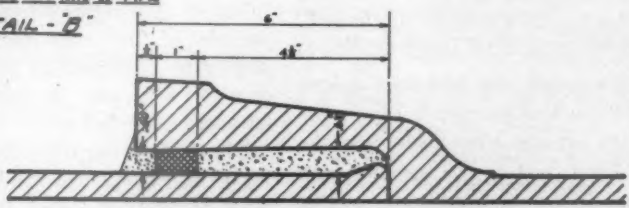
Showing Location of 1"x1"x⅝" Steel Blocks in Hub End of Pipe

DETAIL - "B"



Showing First Placement of Cement in Hub Before Spigot is Inserted

DETAIL - "A"



CEMENT JOINT #1

-16"- TENTATIVE - ALTERNATE - STANDARD -

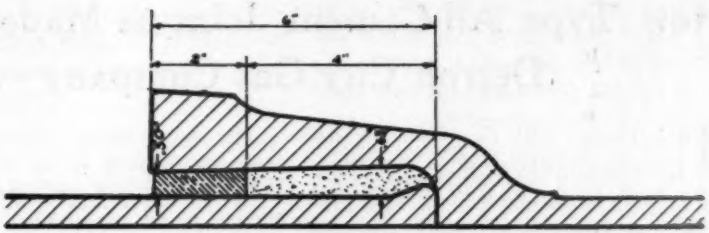
Yarn

Cement

DRAWING No 1

Detroit City Gas Co.

Street Dept. — Dec. 6, 1924



Drawing No. 2.

around the shoulder of the inside of the bell before the spigot end was driven home. This cement seal was permitted to set for about three hours, which gave it sufficient strength to prevent any squeezing through of the cement used in making the joint.

The omitting of the first yarning made it necessary to employ some other means of centering the spigot in the bell. This was accomplished by two small steel blocks ⅜" x 1" x 1" placed 5" apart, off center and at the bottom of the bell, as shown in Detail B of Drawing No. 1.

After the spigot end had been driven home and the seal permitted to set for three hours, cement was packed into the joint by hand, and lightly tamped with the fingers till the cement was even with the face of the bell and the joint apparently full of cement. A heavy double strand of yarn was then driven into the joint to eliminate voids and insure compactness of the cement. The face of the bell was then finished with cement and the joint cared for during the period of setting in the usual manner.

Atlas cement was used, which a laboratory test showed approved quality.

All joints were tested under an air pressure of 25 pounds, fifteen hours after making. The joints were then kept under pressure for several hours, during which time frequent applications of soap suds were made.

Out of 136 joints made by this method, 2, or approximately 1.5%, were failures. The failures happened in early periods of the construction, and can largely be attributed to inexperience on part of workmen in handling cement on large pipe joints.

The failures were repaired by removing 2" of cement and caulking with lead wool, as shown in Detail, Drawing No. 2.

These joints were made at a cost of 57.2c per joint.

The cost of the combination lead wool and cement joint we have been making on pipe of similar size was $3.56 per joint.

These costs are itemized on Drawing No. 3, exhibited here.

The saving effected is approximately $3.00 per joint, of which $1.83 is in material and $1.17 is in labor.

With such a saving in view, we consider it well worth our while to give the joint a thorough trial. We are well pleased with our success so far.

16" Cement Joint

Cement	18½ lbs. at 1¢ per lb.	$ .185
Yarn	6½ ozs. at 7¢ per lb.	.025
Metal Blocks		.05
Total Material Cost		$ .26
Labor, 45¢ per hour—42 minutes		.312
Total Cost per Cement Joint,		$ .572

16" Combination Joint—Lead Wool and Cement

Lead Wool	28 lbs. at 7¢ per lb.	$1.96
Cement	5 lbs. at 1¢ per lb.	.05
Yarn	1 lb. at 8¢ per lb.	.08
Total Material Cost		$2.09
Labor—per Joint		1.47

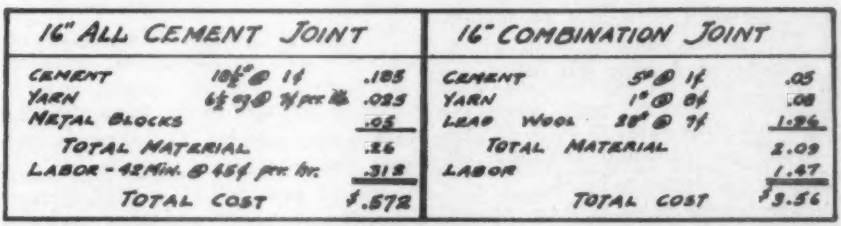
(Labor includes use of air compressor and its operator to run same, also, cost of installing and moving 1½" air lines.)

Total Cost per Combination Joint $3.56

Testing Laboratory Report (Atlas Cement)

Recommended Consistency	23% (by weight)
Initial set	3 hrs. 10 min.
Final set	6 hrs. 10 min.
Fineness	208 mesh—20.2%
Boiling	O. K.
Tensile Strength	230 lbs. (average)
Crushing Strength	6194 lbs. per sq. in.

The Testing Laboratory recommends 23% consistency of water for proper setting of this cement.


16" ALL CEMENT JOINT
CEMENT 18½ lbs. @ 1¢ .185
YARN 6½ ozs @ 7¢ per lb. .025
METAL BLOCKS .05
TOTAL MATERIAL .26
LABOR - 42 Min. @ 45¢ per hr. .312
TOTAL COST $.572
16" COMBINATION JOINT
CEMENT 5 lbs @ 1¢ .05
YARN 1 lb @ 8¢ .08
LEAD WOOL 28 lbs @ 7¢ 1.96
TOTAL MATERIAL 2.09
LABOR 1.47
TOTAL COST $3.56

Drawing No. 3.

(Continued from page 180)

VALVES (Needle Valves for Gas Stoves)
Acme Brass Works, Detroit, Mich.
Claus Automatic Gas Cock Co., Milwaukee, Wis.
Detroit Brass & Malleable Works, Detroit, Mich.
Peninsular Brass Works, Detroit, Mich.
McRae & Roberts Co., The, Detroit, Mich.
Roberts Brass Mfg. Co., The, Detroit, Mich.

WASHING MACHINES
Detroit Washing Machine Corp., Detroit, Mich.
"1900" Washer Co., The, Binghamton, N. Y.

WATER HEATERS
A-B Stove Co., Battle Creek, Mich.
Baltimore Gas Appliance & Mfg. Co., The, Baltimore, Md.
Bartlett & Co., Inc., Philadelphia, Pa.
Bastin-Morley Co., La Porte, Ind.
Bryant Heater & Mfg. Co., The, Cleveland, O.
Geo. M. Clark & Co., Div., Chicago, Ill.
Cleveland Heater Co., The, Cleveland, O.
Abram Cox Stove Co., Philadelphia, Pa.
Wm. M. Crane Co., 16 W. 32nd. St., New York, N. Y.
Detroit Stove Works, Detroit, Mich.
Eclipse Gas Stove Co., Rockford, Ill.
Elliott Water Heater Co., Inc., Brooklyn, N. Y.
Estate Stove Co., Hamilton, O.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Hoffman Heater Co., The, Lorain, O.
Humphrey Co., Div., Kalamazoo, Mich.
Kidde & Co., 103 Park Ave., New York, N. Y.
Kompak Company, The, New Brunswick, N. J.
Lawson Mfg. Co., Pittsburgh, Pa.
Lovekin Water Heater Co., The, 39 Laurel St., Philadelphia, Pa.
Michigan Stove Co., The, Detroit, Mich.
New Process Stove Co., Div., Cleveland, O.
Peninsular Stove Co., Detroit, Mich.

WATER HEATERS—(Continued)
Philadelphia Stove Co., Philadelphia, Pa.
Pittsburg Water Heater Co., Pittsburgh, Pa.
Rathbone, Sard & Co., Albany, N. Y., Aurora, Ill.
Reliable Stove Co., Div., Cleveland, O.
B. Ryan & Co., 372 W. 15th St., New York, N. Y.
Ruud Mfg. Co., Pittsburgh, Pa.
Sands Mfg. Co., The, Cleveland, O.
Trenkamp Stove & Mfg. Co., The, Cleveland, O.
Van Zandt Gas Appliance Co., 4050 Olive St., St. Louis, Mo.
Wales Co., The, Kalamazoo, Mich.

WATER SOFTENERS
Refinite Co., Inc., The, Omaha, Neb.

WATER STILLS (Gas Heated)
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Young Bros. Co., Detroit, Mich.

WELDED STEEL PIPE
Bartlett Hayward Co., The, Baltimore, Md.
Steere Engineering Co., Detroit, Mich.
Western Gas Construction Co., The, Fort Wayne, Ind.

WELDING
S O S Welding Corp., 235 Sixth St., Brooklyn, N. Y.

Formulae for Computing Oil Per M and Heating Value of Carburetted Water Gas

A. C. HOWARD, United Gas & Electric Engineering Corporation, New York, N. Y.

IT is frequently necessary to estimate or calculate the heating value of the carburetted water gas which will be produced by using a known number of gallons of oil per thousand feet of gas and also to estimate or calculate the number of gallons of oil per thousand which will be required to produce a carburetted water gas of a known heating value.

Five variables enter this calculation.

1. The heating value in B.t.u. per cu. ft. of carburetted water gas, which we will designate by H_c.

2. The heating value in B.t.u. per cu. ft. of oil gas produced from the oil, which we will designate by H_o.

3. The heating value in B.t.u. per cu. ft. of blue gas, which we will designate H_b.

4. The gallons of oil per thousand cu. ft. carburetted water gas, which we will designate G.

5. Feet of gas produced from a gallon of oil, which we will designate F.

The equation for making this calculation is:

$$H_c = \frac{F \times G \times H_o}{1000} + \frac{(1000 - (F \times G))\ H_b}{1000}$$

and it takes some little time to solve it.

This equation can be simplified as follows:

$$\text{(a)}\quad H_c = H_b + \frac{F \times G\,(H_o - H_b)}{1000}$$

and

$$\text{(b)}\quad G = \frac{1000\,(H_c - H_b)}{F\,(H_o - H_b)}$$

If we assume that the heating value of blue gas is 300 B.t.u., which is the value usually taken, A becomes C and B becomes D as follows:

$$\text{(c)}\quad H_c = 300 + \frac{F \times G\,(H_o - 300)}{1000}$$

$$\text{(d)}\quad G = 1000\ \frac{(H_c - 300)}{F\,(H_o - 300)}$$

When arranged in this form, the solution is very simple. For example, suppose that in equation c we have F=60 ft., G = 3 gals., and H_o = 1750, then we see offhand that F multiplied by 60 = 180 and that H_o — 300 is 1450, and the numerator of the fraction becomes the product of 1450 and 180 which is 261,000, and pointing off three we have the heating value contributed by the oil, which is 261, which added to 300 gives 561, which is the heating value of the water gas.

As an example of the use of formula d, let us assume that we desire to make a 600 B.t.u. gas. Let us further assume that F equals 65 and that H_c equals 600, then immediately we see that H_c—300= 300, which multiplied by 1000 gives 300,000. We also see that H_o—300=1300, which multiplied by 65 gives 84,500. Dividing 84,500 into 300,000 we have 3.55.

Examining Iron Oxide Sponge

K. M. HOLADAY, Central Illinois Public Service Co., Springfield, Illinois.

THE following work which has been conducted in the Engineering Laboratory of the Central Illinois Public Service Company may be of interest to our members.

As a part of a general scheme for systematically controlling the use of iron oxide sponge in the purifiers of the gas plants operated by this company, some preliminary tests were made in the company's engineering laboratory with a view to adopting a simple and quick method for determining sulphur in samples of new, spent, and revivified oxide mailed to the laboratory from various points in Illinois. Accuracy within 1% was required.

It is understood that the method of fusion with sodium peroxide in a crucible is recommended as the standard method in the Gas Chemists' Handbook published by the American Gas Institute in 1916; that the use of the Parr calorimeter for fusions of this class was suggested by Parr a number of years ago; and that the determination of free sulphur and tar by extraction is also in principle a standard method given in your Handbook. Although the principle of our method is old, some of the details are new and we consider them an improvement. We are submitting the results of our work to you for consideration.

The usual method of oxidation with fuming nitric acid, potassium chlorate, and bromine was first used. The oxidation required considerable time and was difficult to accomplish. The results obtained by this method were not reliable even when the analysis was repeated. It was thought that the variable results might be due to either the loss of sulphur or hydrogen sulphide upon the addition of the acid or to incomplete oxidation. Since the routine analyses would be of most value if they could be made and reported in as short a time as possible, a longer period of oxidation was not tried. Instead, this method was abandoned and the method of fusion with sodium peroxide was tried. A Parr sulphur bomb was used for this purpose.

Since the oxide contained very little combustible material, the Parr sulphur bomb method was not successful unless some sugar or other combustible material was added to the charge. With combustible material thus supplied, a good fusion is obtained; the time required for the determination is no longer than for an ordinary sulphur test on coal; no objectionable fumes are produced; and the results obtained check easily within one percent. The samples should be ground as finely as possible in order to prevent the segregation of the oxide dust from the wood shavings or other sponge material. If the dried sample is passed several times through a coffee mill grinder with the plates set closely together, the particles are usually fine enough. The charge used for the bomb fusion is: .50 grams. Sample, .25 grams pure cane sugar, 1.0 gram potassium chlorate, and 10.0 grams special sodium peroxide. This charge must be well mixed before ignition.

Total sulphur is determined on the dry ground sample.

Free sulphur and tar are determined together by extracting the sample with carbon bisulphide in a Soxhlet's apparatus, distilling of the solvent and weighing the dry residue. Combined sulphur is determined by making a bomb fusion of part of the residue remaining in the thimble from the carbon bisulphide abstraction.

Free sulphur is calculated by subtracting the combined sulphur from the total sulphur.

Tar is calculated by subtracting the free sulphur from the free sulphur and tar.

Abstracts of Technical Articles of Interest to Gas Men

Contributed by Sub-committee on Abstracts* of the Chemical Committee

The Briquetting of Lignites. By Leslie R. Thompson, **Journal of the Society of Chemical Industry,** Vol. 40, No. 19,225T. On account of the experimental work done by the Lignite Utilization Board in an attempt to make a domestic fuel from Saskatchewan lignites. A description of a briquetting plant at Bienfait, Sask., is given. The lignite is carbonized at 600 deg. C., mixed with coal tar pitch, and briquetted. Thirteen parts of coal tar pitch are used per 100 parts of the carbonized lignite. (R. A. Ragatz.)

The Air Drying of Peat. By Ernest V. Moore, **Journal of the Society of Chemical Industry,** Vol. 40, No. 19, 229T. The peat is excavated from the bog, macerated, spread out into a layer 3 to 6 inches thick, and is cut up into blocks. It is air dried 30 to 40 days, which reduces the moisture content to about 30%. Peat cannot be air dried during freezing weather. (R. A. Ragatz.)

The Claude Synthetic Ammonia Process and Plant. By J. H. West, **Journal of the Society of Chemical Industry,** Vol. 40, No. 22, 420R. The mixture of nitrogen and hydrogen is compressed to 900 atmospheres and is passed through several catalyst chambers which are maintained at 600 deg. C. The reaction develops enough heat to keep the chambers at the proper temperature. The gases issuing from the chambers are passed through water cooled pipes, and most of the ammonia is condensed. The uncombined gas from the last catalyst chamber is again passed through the system. The higher pressures employed give a higher per cent yield than does the Haber process, and also permits using smaller catalyst chambers. It is claimed that the catalyst is not poisoned by carbon monoxide. The catalyst tubes are made by boring out special nickel chromium castings. Nitrogen is obtained by liquifying air, and hydrogen by liquifying coke oven or water gas, or by electrolysis. (R. A. Ragatz.)

Determination of the Melting and Boiling Points of Anthracene, Phenanthrene, and Carbazole. By W. Kirby, **Journal of the Society of Chemical Industry,** Vol. 40, No. 22, 274T.

	Melting Point	Boiling Point
Anthracene	218 deg. C.	340 deg. C.
Phenanthrene	101	332
Carbazole	247	351.5

(R. A. Ragatz.)

Note on the Recovery of Alcohol Vapor from Air. Comparison of the Working Data with Theoretical Conclusions. By Alan A. Drummond, **Journal of the Society of Chemical Industry,** Vol. 40, No. 23, 284T. Cresol has little advantage over water as an absorbent for alcohol vapors. The presence of salt in the water does not affect the efficiency of absorption. The theoretical quantity of wash water required under certain conditions is compared to the amount actually used in practice. (R. A. Ragatz.)

(Following Abstracts selected from Chemical Abstracts by E. C. Uhlig)

Carbon Dioxide Indicator of Simple Design and Rugged Construction. Anon. **Elec. Rev.** (Chicago) 79, 218 (1921). The instrument worked by a minute jet of steam continuously aspirates gases from the flue to which it is connected. The gas drawn through an Al filter passes into a chamber of the indicator with a porous pot inside contg. a dry reagent. A pipe connects the chamber with a vessel contg. water into which dips one end of a second pipe, the other end of which is taken into the porous pot. Some gas penetrates into the interior of this pot and is absorbed by the reagent causing partial vacuum and the colored liquor rises in the glass tube calibrated in percentages of CO_2, which may be read at considerable distance. Renewal cartridges inserted once in 24 hours maintain the instrument in continuous operating condition.

*Abstractors' names appear in parentheses following each item.

Carbonization of Coal at Low Temperature. By John Roberts, **Iron & Coal Trades Rev.** 103, 193-6 (1921); **Gas World** 75, 129-31 (1921); 13 figs. It is shown that semi-coke of a suitable degree of hardness, density and toughness can be produced in the lab. by pre-treating the coal before carbonization, the preliminary treatment also serving to increase the heat cond. of the charge while at the same time preventing expansion and increasing the crushing strength. The desired result can be obtained with small or large charge, the form of the retort having little influence on the quality of the product. It is predicted the semi-coke can and will be produced in bulk by carbonization in coke ovens and in gas retorts, with standard plant. The principle of the pre-treatment consists in mixing with the coal high-temp. coke or pulverized coke breeze in suitable proportions which must be detd. by lab. tests for any given coal. Also in Gas World 75, No. 1937 (coking and by-products sec.), 17-20 (1921).

The Automatic Calorimeter and the Registering Gas Balance as Modern Control Apparatus in Gas Factories. By A. Hoffman, **Hamburg, Feuerungstechnik** 9, 186-9 (1921). Description, with illustrations, of Junkers' registering calorimeter and Lux's self-registering gas balance.

The Self-Registering Determination of the Heating Value of Gases. By E. Heer, **Feuerungstechnik** 9, 155-7 (1921). Description of the Junkers calorimeter.

Deterioration of the Coking Property of Coal. By Wm. Seymour, **Blast Furnace and Steel Plant,** 9, 435-7 (1921). Changes in coal after storage have heretofore been studied only for the heating value. Spontaneous internal heating has lately been found to cause deterioration in the coking property also. It was found that there is increase in wt., due to absorption of O, so that the H-O ratio drops rapidly. Data are given to show these changes. The tests prove that at 100° the coking property is destroyed. In making any test it should be considered that storage conditions differ from the recommended laboratory method in that (1) much coal is lump; (2) air has not free access and (3) storage piles contain H_2O vapor. Cannelton coal from W. Va. was investigated to det. the deterioration after submission to different temps. and times. A procedure was adopted from this study to predict the probable deterioration of any coal. To 5 g. of sample passing a 100-mesh screen is added 100 cc. of 10% HCl, the mixt. is boiled a few min., filtered, the residue washed with hot H_2O and the filtrate discarded. The residue is then washed with boiling N KOH to total a 50 cc. filtrate. The filtrate is compared with standard color Nessler solns. An empirical standard must be established. The brown color varies in depth with the extent of deterioration in coking property. Fresh coal gives no color. Results plotted with daily coke production show a remarkable correlation, and prove further that it is important to get coal to the ovens as soon as possible.

Some Critical Observations on the Generation of Producer Gas. I. Production of Low-Nitrogen Gases in the Gas Producer. By J. Gwosdz, **Charlottenburgh. Brennstoff-Chem.** 2, 209-12 (1921). The continuous production of water gas in externally heated retorts has been attended with many technical difficulties, such as incomplete decomposition and high fuel consumption, while ordinary producer practice results in a gas high in inert constituents. G. reviews many of the proposals which have been made to produce a gas similar to water gas by the use of O_2 or "Lind'e-air" (enriched air), diluted with H_2O or CO_2 in the ordinary producer. Hempel's researches of 1901 (Ver. zur Beforderung des Gewerbefleisses 242 (1902), and Mezger's expts. with oil shale (C. A. 14, 2700) constitute the only actual exptl. work on the question which has appeared, and in both cases the results were disappointing partly because of the small scale on which they were secured. The proposals deserve to be tried seriously on a large scale.

Flow of Gas at Low Pressures Through Capillary Tubes. By G. W. Todd. **Proc. Univ. Durham Phil. Soc.** 6, I, 8-15 (1920); **Science Abstracts** 24A. The laws for the flow of gas through tubes at ordnary pressures and at extremely low pressures, where the mean free path of the mols. approaches the dimensions of the measuring app., are very different, and are inadequate to express the facts for intermediate pressures. Expts. are described having for their object the finding of an empirical expression for the flow of a gas through a tube which would represent the facts for all pressures. A large number of readings are tabulated for air and H with capillary tubes of various ascertained dimensions. These results are plotted, and it is found that the viscosity of air flowing along a tube of circular cross-section is a function of the product of mean pressure into the diam. The form of the function is discussed, and the relationships arrived at are compared with Knudsen's formula.

AMERICAN GAS ASSOCIATION, Inc.

Current List No. 50—March, 1922

Rate Changes

Where information is not secured from company receiving increase, the source of information is noted in brackets. See Cumulative List No. 7, of March, 1921, for explanation of abbreviations. This list includes only changes reported as secured subsequent to June 1921.

ALABAMA

Huntsville: Co., reports a voluntary reduction effective April 1, 1922. New rate: $2.25 per MCF. Penalty 10% 10 days.

ARKANSAS

Helena: Co., reports decrease effective Dec. 15, 1921. New rate: 7 CCF. or less $1.58 gro., $1.50 net—next 43 CCF. $1.75 per M.—next 20 MCF. $1.50—next 25 MCF. $1.25—over 50 MCF. $1.15 per M.—disc. 5%, 10 days. P. P. Meters $1.90 per MCF. M.M. Chg. $1.50 net.

CALIFORNIA

Stockton: Co., reports decrease effective Dec. 31, 1921. New rate: 1st 25 MCF. $1.22—next 25 MCF. $1.07—next 25 MCF. disc. 5¢ per M.—next 25MCF. 97¢ net.—next 25 MCF. 87¢—next 25 MCF. 77¢—over 125 MCF. 72¢ net per M. M.M. Chg. 85¢ net.

CONNECTICUT

Bridgeport: Co., reports decrease effective April 1, 1922. New rate: 1st 5 MCF. $1.50—next 20 MCF. $1.30—next 25 MCF. $1.25—next 50 MCF. $1.20—next 400 MCF. $1.15—next 500 MCF. $1.10—over 1,000 MCF. $1.05 per M. M.M. Chge. 50¢.

New Haven: Co., reports decrease effective April 1, 1922. New rate: 1st CCF. 51¢—next 390 CCF. 11½¢—next 600 CCF. 11¢—next 1,000 CCF. 10½¢—over 2,000 CCF. 10¢ per C. Disc. 1¢ per CCF. D. P.

FLORIDA

Tampa: Gas. Co., reports decrease effective Jan. 1, 1922. New rate: 1st 10 MCF. $2.14—next 10 MCF. $2.06—next 20 MCF. $1.67—over 40 MCF. $1.45 per M. Disc. 10%. M.M. Chge. 1.00 net. B.t.u. avge. 530, effective same date. Old rate 1st 20 MCF. $2.25—next 20 MCF. $1.94—over 40 MCF. $1.67 per M. dis. 10%. M.M. Chge. $1.00 net.

ILLINOIS

Chicago: Co., reports decrease effective Feb. 1, 1922. New rate: 1st 4 CCF. or less 60¢—Primary rate $1.00 per MCF. above 4 CCF. and within 10 MCF. secondary rate 95¢ above 10 MCF. to 50 MCF.—Wholesale over 50 MCF. rate 90¢ per M. M.M. Chge. unchanged.

INDIANA

New Albany: Co., reports decrease effective Nov., 1921. New rate: $1.60 gro. $1.50 net per MCF. M.M. Chge. 75¢. B.t.u. 570.

MASSACHUSETTS

Fitchburg: Co., reports decrease effective Feb. 1, 1922. New rate: 1st 25 MCF. 16¢ net per CCF.—next 25 MCF. 14½¢—next 200 MCF. 13½¢—next 500 MCF. 13¢—over 750 MCF. 12½¢ net per CCF.

Lawrence: Co., reports decrease effective Jan. 1, 1922. New rate: 15½¢ per CCF. disc. 1¢ per CCF. D. P.

Leominster: Co., reports decrease effective Feb. 1, 1922. New rate: 10¢ less each step discount and M.M. Chge. unchanged.

MICHIGAN

Ann Arbor: Co., reports a voluntary decrease effective Jan. 1, 1922. New rate: 1st 5 MCF. $1.50—next 195 MCF. $1.30—over 200 MCF. $1.10 per M. disc. 25¢ per M. S. Chge. 30¢ per month per meter.

Big Rapids: Co., reports third increase effective Jan. 1, 1922. New rate: "Service Rendered" Chge. 50¢ plus 25¢ per CCF. for 1st MCF.—over 1 MCF. 16½¢ per CCF. net, gro. 2½¢ higher. Note: As an inducement to use more gas all consumers on the books Dec. 31, 1921, may secure extra gas for the first six months of 1922 at $1.00 per M. on the excess as compared with the same month of preceding year. B.t.u. 550. Min. 500.

Hancock: Co., reports decrease effective Nov. 1, 1921. New rate: $1.75 gro., $1.65 net per MCF. M.M. Chge. 50¢.

Ionia: Co., reports decrease effective Feb. 1, 1922. New rate: from 5 CCF. to 5 MCF. $1.80 per M.—next 5 MCF. $1.70—next 15 MCF. $1.60—over 25 MCF. $1.50 per M. disc. 10¢ per M. M.M. Chge. less than 5 CCF. on 3-5 and 10 lt. meters 75¢ gro., 70¢ net. 20 lt. and over $1.50 gro. $1.40 net per mo. C.P. 16.

Lansing: Co., reports decrease effective Jan. 1, 1922. New rate: Dom. $1.45 gro., $1.35 net per MCF. M.M. Chge. 50¢. Ind. 1st 100 MCF. $1.45—next 100 MCF. $1.20—next 800 MCF. $1.05—over 1,000 MCF. 95¢ per M. disc. 10¢ per M. M.M. Chge. for all users over 100 MCF. per month 10% of max. bill for past 12 months. S. Chge. discontinued. B.t.u. 530.

Mt. Pleasant: Central Gas Co., reports decrease effective July 1, 1921. New rate: $1.70 per MCF. Penalty 10¢ per M. 10 days.

Niles: Co., reports decrease effective Sept. 1, 1921. New rate: 1st 10 MCF. $1.90—next 10 MCF. $1.80—next 10 MCF. $1.70—next 70 MCF. $1.60—over 100 MCF. $1.50 per M. disc. 5¢ per M. B.t.u. Max. 600, Min. 550.

Port Huron: Gas & Electric Co., reports rate effective Mar. 1, 1921. New rate: $1.30 per MCF. disc. 10¢ per M. D.P.

Sault Ste. Marie: Co., reports decrease effective Sept 20, 1921. New rate: $1.60 gro., $1.50 net 10 days per MCF. plus R.T.S. Chge. 50¢ per mo. 10 lt. or less—20 lt. 75¢—30 lt. $1.00—45 lt. $1.25—60 lt. $1.50—80 lt. $1.75—100 lt. $2.00—150 lt. $2.50.

Three Rivers: Co., reports decrease effective Sept. 1, 1921. New rate: $1.90 gro., $1.80 net per MCF. M.M. Chge. 50¢.

MINNESOTA

Stillwater: Northern States Power Co., reports decrease effective Jan. 1, 1922. New rate: $1.40 MCF. dis. 10%, 10 days on bills of $1.00 or over. Old rate $1.70 per MCF. with same discount.

MISSISSIPPI

Greenville: Co., reports third increase effective Sept. 1, 1921. New rate: 1st 10 MCF., $2.00—next 10 MCF. $1.90—next 10 MCF. $1.80—next 10 MCF. $1.70—over 40 MCF. $1.60 per M. disc. 10¢ per M. 10 days. S. Chge. $1.00.

Meridian: Co., reports increase effective Feb. 1, 1922. New rate: 1st 5 MCF. $2.00—next 10 MCF. $1.75—next 10 MCF. $1.50—next 25 MCF. $1.25—next 50 MCF. $1.00—over 100 MCF. 75¢ per M. Disc. 5% 10 days. M.M. Chge. $1.00.

MONTANA

Billings: Co., reports Natural Gas rate effective Dec. 19, 1921: First 100 MCF. 50¢—next 100 MCF. 45¢—next 100 MCF. 40¢—next 100 MCF. 35¢—next 100 MCF. 30¢—next 100 MCF. 25¢—next 400 MCF. 20¢—over 1,000 MCF. 15¢ per M. Penalty 5¢ per M. 10 days. M.M. Chge. $1.00.

NEBRASKA

Hastings: Co., reports decrease effective Jan. 1, 1922. New rate: Gross rate $1.75 per MCF. to 5 MCF. disc. 5¢ per M. Over 5 MCF. disc. 10¢ per M. Ind. over 10 MCF. but not over 20 MCF. disc. 15¢ per M. M.M. Chge. 40¢.

NEW HAMPSHIRE

Nashua: Co., reports decrease effective Mar. 1, 1922. New rate: $1.70 gro., $1.50 net per MCF. S. Chge. unchanged. B.t.u. 550 avge.

NEW YORK

Binghamton: Co., reports decrease effective April 25, 1921. New rate: 1st 10 MCF. $1.35—over 10MCF. $1.75 per M. M.M. Chge. 55¢ up to 4 CCF.—disc. 5¢ on M.M. Chge.—10¢ per M. 10 days.

Kingston: Co., reports decrease effective Jan. 17, 1922. New rate: 1st CCF. 57¢—next 49 CCF. $1.65 per M.—next 5 MCF. $1.60—next 10 MCF. $1.55—next 20 MCF. $1.50—next 30 MCF. $1.45—next 30 MCF. $1.40—over 100 MCF. $1.30 per M. P. S. C. Bul. No. 700.

Newtown: Gas Co., reports decrease effective Jan. 23, 1922. New rate pending final determination $1.15 per MCF. Old rate $1.25 per MCF. P.S.C. Bul. No. 700.

Norwich: Co., reports decrease effective Feb. 1, 1922. New rate: 1st 10 MCF. 21¢ per CCF.—next 10 MCF. 18¢—next 10 MCF. 16¢—next 20 MCF. 13½¢ over 50 MCF. 12½¢ per CCF. P.S.C. Bul. No. 701.

Oneonta: Co., reports decrease effective Feb. 1, 1922. New rate 21¢ per CCF. P.S. C. Bul. No. 701.

RHODE ISLAND

Bristol: Co., reports decrease effective Jan. 1, 1922. New rate: $1.46 per MCF. S. Chge. 50¢ per month.

WISCONSIN

Green Bay: Co., reports decrease effective Jan. 16, 1922. New rate: 1st 5 MCF. $1.60—next 5 MCF. $1.50—next 10 MCF. $1.45—over 20 MCF. $1.35 per M. disc. 10¢ per M. M.M. Chge. unchanged.

Employment Bureau

SERVICES REQUIRED

WANTED—Fitter who can do good work on installation of water heaters, ranges and who thoroughly understands Gas Company appliance work. Address A. G. A.
Key No. 01.

HIGH GRADE Industrial Sales Engineer wanted. Must be man having had factory experience and knowledge of house heating. Gas company in middle west has need of such a man and requests applicants to give full particulars of experience. Appointment for interview will be arranged. Address American Gas Association.
Key No. 0-3.

SERVICES OFFERED

WANTED—Position as executive in a local office of a gas or a combination gas and electric company. Have had a practical experience in all branches of commercial utility work. Have been successful in dealing with the public and promoting good will of utility companies. Educated in commercial and accounting methods as compiled by N. C. G. A. and N. E. L. A. Well acquainted in office routine and very exact on details and execution of same. Address A. G. A.
Key No. 114.

GAS APPLIANCE SALESMAN—Especially trained in water and house heating; 15 years' experience; desires selling position, either road or local, with aggressive appliance manufacturer or gas company. Will furnish best selling reference. Drawing account against commission. Address A. G. A.
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WANTED—Position as Industrial Fuel Engineer or manufacturer's representative of Domestic or Industrial appliances seeks employment. Prefers Eastern territory but will consider other location. Moderate salary and commission or straight salary. 34 years of age. Married. Reliable references. Address A. G. A.
Key No. 137.

WANTED—Position by a man of large general experience in gas business who has made a special study of sales promotion problems, and who would prove valuable as an assistant to a busy executive in any department. Address A. G. A.
Key No. 134.

ENGINEER—Producing results in operating desires to make change, either as Engineer or Assistant Engineer of Works with output over 20,000,000 daily output. Or in Managing capacity. Address A. G. A.
Key No. 135.

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Address Key No. 136.

GAS PLANT PROPRIETORS—Is your gas plant run down? Is it paying dividends? Let me reorganize it and put it on a paying basis for you. To take personal charge. Address A. G. A.
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INDUSTRIAL FUEL ENGINEER—Knowing heat treatment as applied to general industrial problems, house heating, hot water storage, and who knows the construction, operation and proper installation of every appliance he handles. Who has sold himself "Gas" as The heat treating medium, who has excellent "business getting" and executive abilities, would like to change to corporation where his abilities can be better utilized. Address A. G. A.
Key No. 139.

POSITION WANTED—Technical graduate with some experience in all branches of combination, manufactured, and natural gas companies, but particularly as head of industrial and new business departments, desires responsible position with a future. Address A. G. A.
Key No. 140.

AMERICAN GAS ASSOCIATION, INC.

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